

AGENCY FOR HEALTHCARE RESEARCH AND QUALITY

AHRQ

The Healthcare Cost and Utilization Project (HCUP)

HCUP Data Analytic Tools

Day 1: Introduction to HCUP and Tools for ICD-10-PCS and CPT/HCPCS Level II Procedures

Agency for Healthcare Research and Quality
Virtual Workshop ♦ October 27, 2021

Workshop Agenda Day 1

Topic	Duration	Start Time (PST/EST)
Introduction of HCUP	60 min	9:00 a.m./12:00 p.m.
HCUP Tools for ICD-10-PCS Procedures	60 min	10:00 a.m./1:00 p.m.
Q&A	10 min	11:00 a.m./2:00 p.m.
Break	10 min	11:10 a.m./2:10 p.m.
HCUP Tools for CPT® and HCPCS Level II Codes	40 min	11:20 a.m./2:20 p.m.
How to decide which procedure tool is best suited for your study?	5 min	12:00 p.m./3:00 p.m.
Brief introduction to resources on the HCUP-US website	5 min	12:05 p.m./3:05 p.m.
Q&A	15 min	12:10 p.m./3:10 p.m.

Introduction to HCUP

What Is HCUP?

The HCUP Partnership

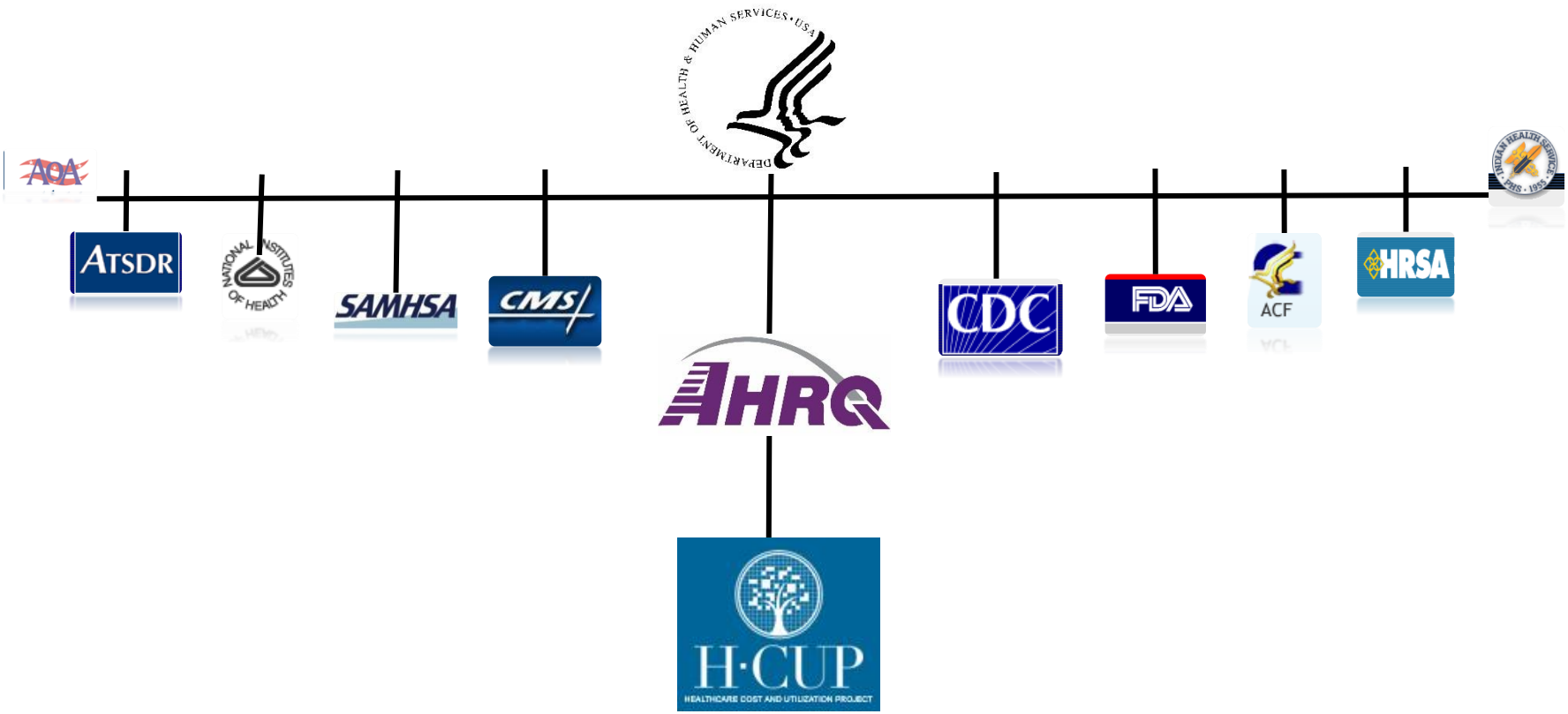
State

Federal

Industry

Sponsored by the Agency for Healthcare Research and Quality (AHRQ)

The Agency for Healthcare Research and Quality (AHRQ) is a Federal agency under the Department of Health and Human Services.



Available HCUP Resources

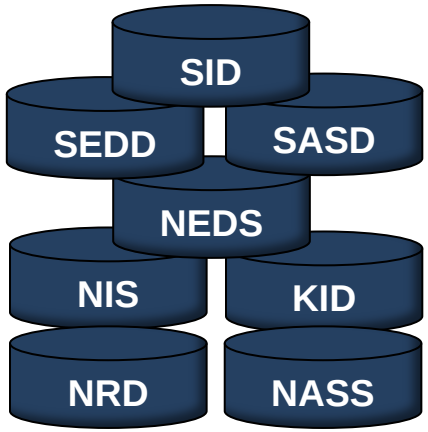
Federal-State-Private Partnership

HCUP is a comprehensive set of **publicly available all-payer** healthcare data (including self-pay and those billed as "no charge")

H-CUP
HEALTHCARE COST AND UTILIZATION PROJECT

Includes **multiyear** inpatient and outpatient data based on **hospital billing** records

HCUP Databases



Online Tools

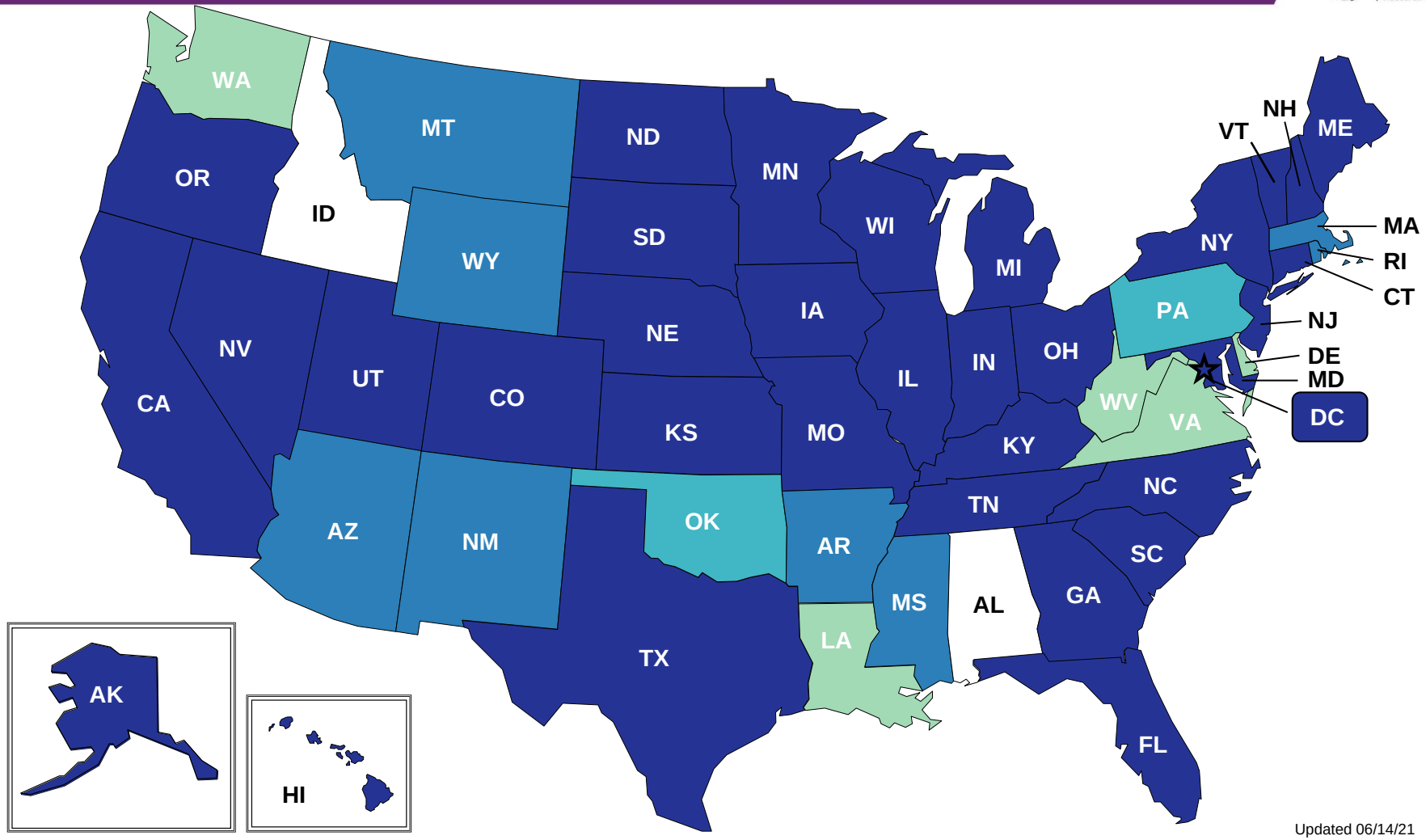
Analytics

User Support

HCUP Data Partners

Alaska Department of Health and Social Services
Alaska State Hospital and Nursing Home Association
Arizona Department of Health Services
Arkansas Department of Health
California Office of Statewide Health Planning and Development
Colorado Hospital Association
Connecticut Hospital Association
Delaware Division of Public Health
District of Columbia Hospital Association
Florida Agency for Health Care Administration
Georgia Hospital Association
Hawaii Laulima Data Alliance
Hawaii University of Hawai'i at Hilo
Illinois Department of Public Health
Indiana Hospital Association
Iowa Hospital Association
Kansas Hospital Association
Kentucky Cabinet for Health and Family Services
Louisiana Department of Health
Maine Health Data Organization
Maryland Health Services Cost Review Commission
Massachusetts Center for Health Information and Analysis
Michigan Health & Hospital Association
Minnesota Hospital Association (provides data for Minnesota and North Dakota)
Mississippi State Department of Health
Missouri Hospital Industry Data Institute
Montana Hospital Association
Nebraska Hospital Association
Nevada Department of Health and Human Services
New Hampshire Department of Health & Human Services
New Jersey Department of Health
New Mexico Department of Health
New York State Department of Health
North Carolina Department of Health and Human Services
North Dakota (data provided by the Minnesota Hospital Association)
Ohio Hospital Association
Oklahoma State Department of Health
Oregon Association of Hospitals and Health Systems
Oregon Office of Health Analytics
Pennsylvania Health Care Cost Containment Council
Rhode Island Department of Health
South Carolina Revenue and Fiscal Affairs Office
South Dakota Association of Healthcare Organizations
Tennessee Hospital Association
Texas Department of State Health Services
Utah Department of Health
Vermont Association of Hospitals and Health Systems
Virginia Health Information
Washington State Department of Health
West Virginia Department of Health and Human Resources, West Virginia Health Care Authority
Wisconsin Department of Health Services
Wyoming Hospital Association

HCUP Participation by Data Type



Updated 06/14/21

Partners Providing:	Inpatient Data	Inpatient and Ambulatory Surgery and Services Data	Inpatient and Emergency Department Data	Inpatient, Ambulatory Surgery and Services, and Emergency Department Data	Non-participating

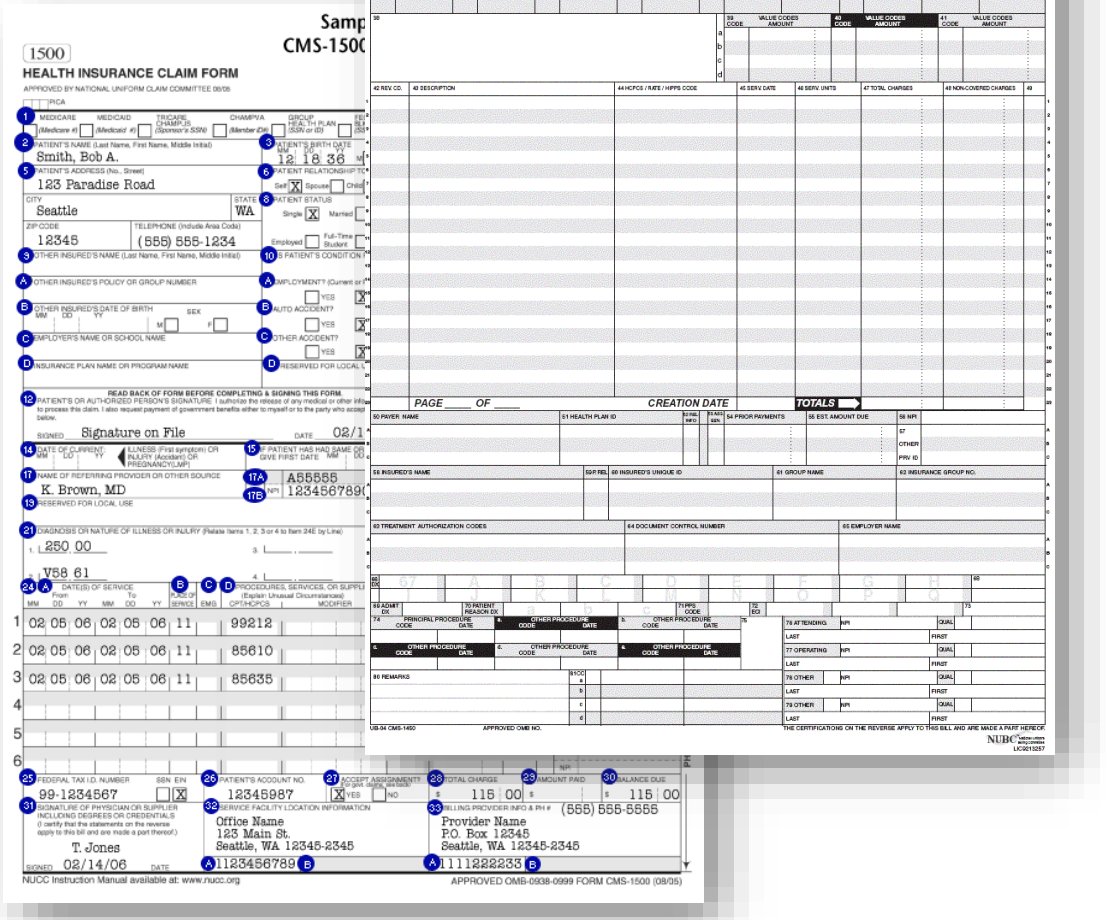
What Is the Foundation of HCUP Data?

HCUP Data Are Based on Hospital Billing Data

UB-04
CMS 1500

Demographic Data

Diagnoses
Procedures
Charges



The Making of HCUP Data

Patient enters hospital

Billing record created

Hospital sends billing data and any additional data elements to data organizations

States store data in varying formats

744	98	749	2	79	257	5	290
745	25	614	4	84	541	4	549
746	68	195	1	78	669	3	523
747	43	726	3	46	211	4	970
748	81	533	6	98	83	8	40
749	51	418	4	69	496	1	613
750	16	574	2	77	571	1	995
751	2	326	4	44	638	2	958
752	63	521	4	18	217	8	721
753	38	867	4	44	446	2	71
754	50	418	0	59	216	4	799
755	22	806	3	46	573	2	994
756	94	740	6	55	247	1	218
757	36	852	8	8	289	3	559
758	63	386	1	94	838	5	613
759	17	766	8	92	799	5	612
760	54	735	3	29	556	6	503
761	5	263	4	78	125	8	997
762	48	100	3	94	484	8	206
763	23	916	6	15	556	9	327
764	11	251	4	17	125	6	192
765	30	976	1	9	561	6	39

AHRQ standardizes data to create uniform HCUP databases

The Making of HCUP Data Continued

- Quality checks are performed
- Additional data elements are available:
  - Value-added variables (supplemental variables for revisit analyses, injury indicators, indicators for observation and ED services)
  - Hospital characteristics (teaching status, ownership/control, bed size)
  - Diagnosis-related groups and severity measures
    - 3M™ All Patient Refined Diagnosis Related Groups (APR-DRGs)

What Types of Hospitals Are Included in the HCUP Databases?

HCUP Data Come Mostly From Community Hospitals

American Hospital Association Definition:

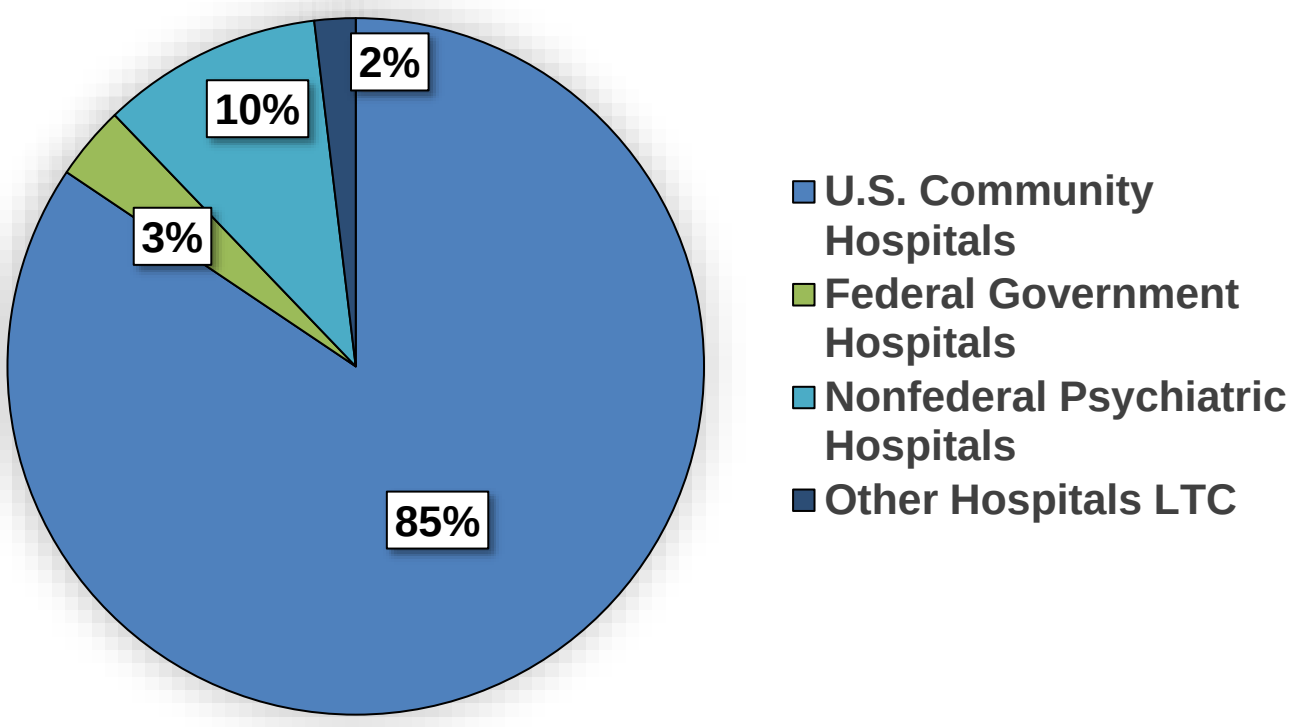
Non-Federal, short-term general, and other special hospitals, excluding hospitals not accessible by the general public (e.g., prison hospitals or college infirmaries)

Included*	Excluded
Multispecialty general hospitals	Non-Federal long-term care hospitals
OB-GYN	Psychiatric
Ear, nose, and throat	Alcoholism/chemical dependency
Orthopedic	Long-term care rehabilitation
Pediatric	Department of Defense/Department of Veterans Affairs/Indian Health Service
Public	College infirmaries
Academic medical centers	Prison hospitals

*Sometimes this also includes short-term rehabilitation and long-term acute care hospitals. Availability varies across HCUP States.

Community Hospitals Represent Majority of Hospitals in the United States

- 85 percent of U.S. hospitals are community hospitals.
- 15 percent noncommunity hospitals (Federal [DoD/VA/IHS], non-Federal psychiatric, non-Federal long-term care, etc.)



Abbreviations: DoD, Department of Defense; IHS, Indian Health Service; LTC, long-term care; VA, Department of Veterans Affairs.
Source: American Hospital Association Annual Survey (Fiscal Year 2019): www.aha.org/statistics/fast-facts-us-hospitals.

Community Hospitals Provide a Range of Services

- HCUP generally does not receive data from noncommunity hospitals, such as psychiatric facilities
- However, if patients are treated for a mental health condition in a community hospital, their information is included

Mental, Behavioral, and Neurodevelopmental Disorders, Top Five Principal Diagnoses	Total Number of Discharges
1. Depressive disorders	509,655
2. Schizophrenia spectrum and other psychotic disorders	391,150
3. Alcohol-related disorders	334,410
4. Bipolar and related disorders	257,130
5. Suicidal ideation/attempt/intentional self-harm	115,230

Source: Weighted national estimates from the 2019 National Inpatient Sample (NIS), Clinical Classifications Software Refined (CCSR) default for principal diagnosis assignment, v2021.2.

Overview of the HCUP Databases

AHRQ Agency for Healthcare Research and Quality

What Types of HCUP Databases Are Available?

HCUP Includes Inpatient and Outpatient Databases

- Different hospital settings
  - Inpatient databases
    - Discharge abstracts for patients admitted for an inpatient stay
  - Outpatient databases
    - Ambulatory surgery encounters
    - ED visits during which patients are treated and released from the ED
- Varying geographic levels
  - State
  - Nationwide
- HCUP databases do not include physician office visits, pharmacy, and laboratory/radiology information

www.hcup-us.ahrq.gov/databases.jsp

HCUP State Databases

State Inpatient Databases (SID)

Inpatient discharge data (including those admissions that started in the ED) from participating HCUP States

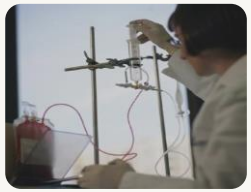
State Ambulatory Surgery and Services Databases (SASD)

Ambulatory surgery data (hospital-owned and some nonhospital-owned facilities) and other outpatient services from participating HCUP States

State Emergency Department Databases (SEDD)

Emergency department data (treat and release) from participating HCUP States

HCUP Nationwide Databases

National Inpatient Sample (NIS)		Generate national and regional estimates of **inpatient** stays
Kids' Inpatient Database (KID)		Generate national and regional estimates of **pediatric inpatient** stays
Nationwide Ambulatory Surgery Sample (NASS)		Generate national and regional estimates of **major ambulatory surgery encounters** in hospital-owned facilities
Nationwide Emergency Department Sample (NEDS)		Generate national and regional estimates of **emergency department** visits across the country
Nationwide Readmissions Database (NRD)		Generate national estimates of all-cause and condition-specific **inpatient readmissions**

Comparison of the HCUP Inpatient Databases

	HCUP Inpatient Databases			
HCUP database	**SID (2019)**	**NIS (2019)**	**KID (2019)**	**NRD (2019)**
States	48 States + DC	48 States + DC	48 States + DC	30 States
Hospitals	4,470	4,568	3,998	2,507
Inpatient discharges	34 million	7 million	3 million	18 million
Derived from	--	SID	SID	SID
Uses	Examine State and local market- area statistics on healthcare utilization, access, quality, patient safety, etc. Readmission analyses possible in some States.	Generate national and regional estimates of healthcare utilization, access, quality, patient safety, etc.	Generate national and regional pediatric estimates of healthcare statistics.	Generate national estimates of all-cause and condition-specific readmissions.

Comparison of the HCUP Outpatient Databases

	Emergency Department Data		Ambulatory Surgery and Services Data	
HCUP database	**SEDD (2019)**	**NEDS (2019)**	**SASD (2019)**	**NASS (2019)**
States	40 States + DC	40 States + DC	34 States + DC	34 States + DC
Hospitals	3,590	989	3,447	2,958
Outpatient records	103 million ED visits	33 million ED visits	19 million ambulatory surgery encounters	9 million major ambulatory surgery encounters
Derived from	–	SID and SEDD	–	SASD
Uses	Examine ED visits at hospital-affiliated EDs that do not result in an admission for a given State.	Generate national and regional estimates for hospital-owned ED visits.	Study encounter-level data for ambulatory surgeries and other outpatient services from hospital-owned facilities.	Generate national and regional estimates of major ambulatory surgery encounters performed in hospital-owned facilities.

Overview of the HCUP Databases

Which
HCUP Database
Would You Use?

Which HCUP Inpatient Database(s) Best Supports the Research Question?

How do inpatient stays related to diabetes differ for patients who reside in urban and rural areas?

SID

NIS

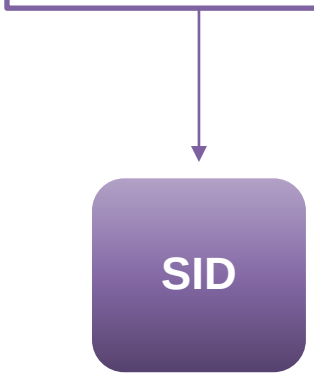
KID

NRD

Which HCUP Inpatient Database(s) Best Supports the Research Question?

How do inpatient stays related to diabetes differ for patients who reside in urban and rural areas?

Are you interested in State-level estimates?



Which HCUP Inpatient Database(s) Best Supports the Research Question?

How do inpatient stays related to diabetes differ for patients who reside in urban and rural areas?

Are you interested in State-level estimates?

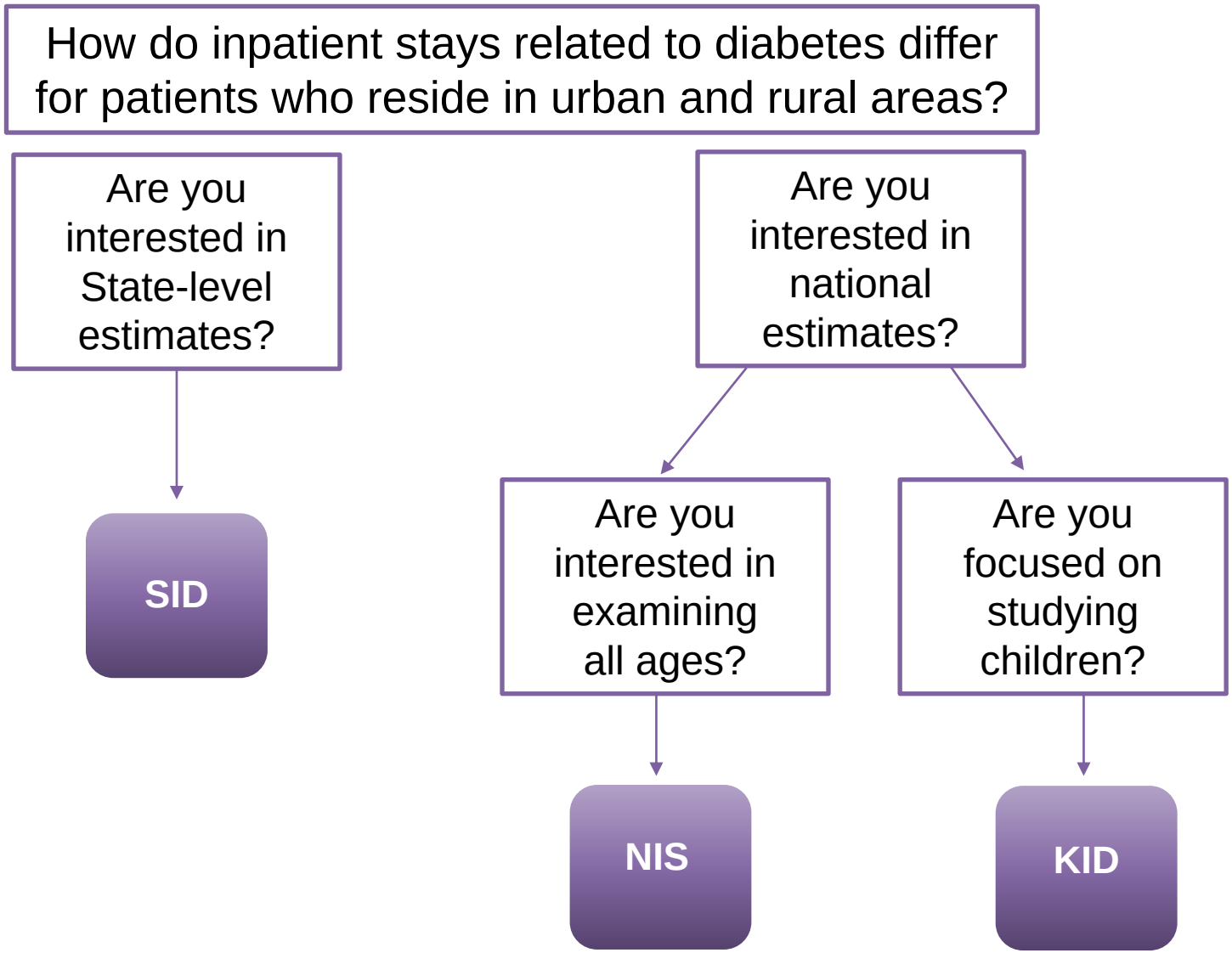
SID

Are you interested in national estimates?

Are you interested in examining all ages?

NIS

Which HCUP Inpatient Database(s) Best Supports the Research Question?



Which HCUP Inpatient Database(s) Best Supports the Research Question?

Are 30-day readmission rates for inpatient stays with at least one diagnosis indicating a chronic condition longer than stays for patients with no chronic conditions?

SID

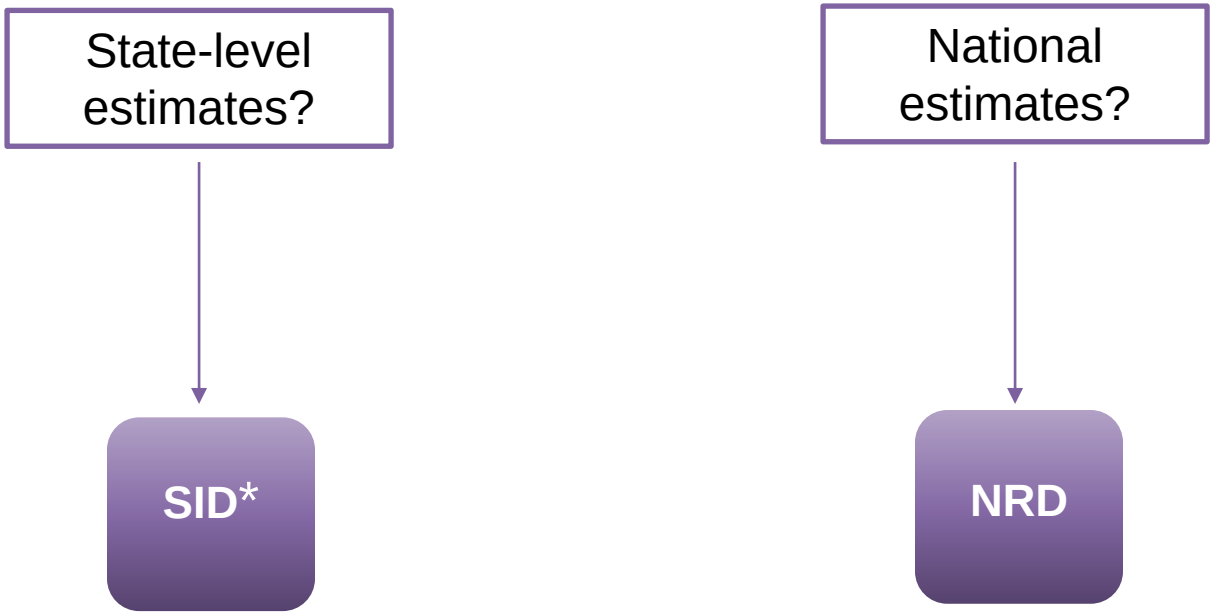
NIS

KID

NRD

Which HCUP Inpatient Database(s) Best Supports the Research Question?

Are 30-day readmission rates for inpatient stays with at least one diagnosis indicating a chronic condition longer than stays for patients with no chronic conditions?



*Only some SID have patient linkage numbers (HCUP data element VisitLink) that are needed for readmission analyses.

Which HCUP Outpatient Database(s) Best Supports the Research Question?

What types of treat-and-release ED visits include substance use reported as a comorbidity?

- SEDD
- SASD
- NEDS
- NASS

Which HCUP Outpatient Database(s) Best Supports the Research Question?

What types of treat-and-release ED visits include substance use reported as a comorbidity?

Are you interested in State-level estimates?

→ **SEDD**

Are you interested in national estimates?

→ **NEDS***

*The NEDS will need to be limited to ED treat-and-release visits using the NEDS data element HCUPFILE.

Which HCUP Outpatient Database(s) Best Supports the Research Question?

What is the number of major ambulatory surgeries for the treatment, fracture, or dislocation of hip or femur?

- SEDD
- SASD
- NEDS
- NASS

Which HCUP Outpatient Database(s) Best Supports the Research Question?

What is the number of major ambulatory surgeries for the treatment, fracture, or dislocation of hip or femur?

Are you interested in State-level estimates?

→ **SASD**

Are you interested in national estimates?

→ **NASS**

Overview of the HCUP Databases

AHRQ Agency for Healthcare Research and Quality

What Data Elements Are Available in the HCUP Databases?

Data Elements Common to the HCUP Databases

- Patient demographics
  - Age, sex, urban/rural location
- Clinical information
  - Diagnoses and procedures
- Discharge information
  - Expected payment source, discharge status
- Resources
  - Length of stay, total charges
- Hospital characteristics
  - Only on HCUP nationwide databases

Some Data Elements Vary by State

- Race and ethnicity
- Patient county
- Patient ZIP Code
- Birthweight
- Revenue center codes and units
- Additional and/or more detailed expected payer information
- Detailed charges

- Synthetic patient linkage numbers
- Synthetic physician identifiers
- Physician specialty
- Hospital identifier (unencrypted)

Example:
Payer Detail Varies by State

PAY1_X		PAY1 (Standardized)	
Value	**Description**	**Value**	**Description**
010	Medicare	1	Medicare
011	Medicare (HMO)		
012	Medicare (Managed care - Other)		
013	Medicare (fee for service)		
020	Medi-Cal	2	Medicaid
021	Medi-Cal (HMO)		
022	Medi-Cal (Managed care - Other)		
023	Medi-Cal (fee for service)		
030	Private Coverage	3	Private insurance
031	Private Coverage (HMO)		
032	Private Coverage (Managed care - Other)		
033	Private Coverage (fee for service)		
08n, where n=0-3	Self-pay	4	Self-pay
--		5	No charge

HCUP Supplemental Files

How Can You Use the HCUP Supplemental Files?

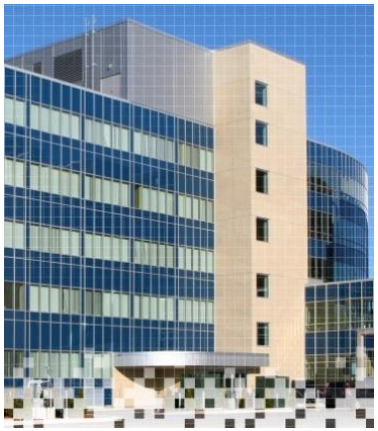
HCUP Supplemental Files Augment Applicable HCUP Databases

- Designed to be used with the HCUP databases to provide access to additional data elements or analytically useful information
- Available for download from the HCUP-US website, or they may be ordered when purchasing the applicable HCUP database

www.hcup-us.ahrq.gov/tools_software.jsp

HCUP Cost-to-Charge Ratio (CCR) Files Convert Total Charges to Costs

Available for HCUP inpatient databases (NIS, KID, NRD, and SID) beginning 2001 and emergency department databases (NEDS and SEDD) beginning 2012



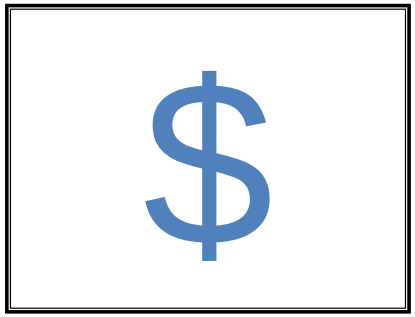
HCUP Database

→

Apply CCRs by Hospital

TOTCHG*CCR

→



Convert Total Charges to Costs

www.hcup-us.ahrq.gov/db/ccr/costtocharge.jsp

AHA Linkage Files Provide Linkage For HCUP Hospital Identifiers

- Linkage between hospital identifiers on the HCUP State Databases to those on the American Hospital Association (AHA) Annual Survey Databases*
- Files are unique by State and year and are available for a subset of HCUP Partners that release AHA identifiers

*Must be purchased separately from the AHA

www.hcup-us.ahrq.gov/db/state/ahalinkage/aha_linkage.jsp

NIS and KID Trend Weights Files Adjust Discharge Weights for Longitudinal Analyses

- Adjust discharge weights to account for sample redesign of the NIS (2012) and KID (2000) when trending across these years
- Files are needed for longitudinal analyses that span these redesign time periods

www.hcup-us.ahrq.gov/db/nation/nis/trendwghts.jsp

www.hcup-us.ahrq.gov/db/nation/kid/kidtrends.jsp

Overview of HCUP Databases

Interested in Purchasing an HCUP Database?

HCUP Databases Available Through HCUP Central Distributor

HCUP Central Distributor website:

www.hcup-us.ahrq.gov/tech_assist/centdist.jsp

- The HCUP Central Distributor provides one-stop shopping for purchasing State and nationwide databases
- Cost and availability of databases varies across years
- Some Partner organizations may place additional restrictions on the sale of their State data

Steps to Purchase HCUP Databases Online

Step	Description	HCUP-US Website
1	Take the Data Use Agreement (DUA) online training	www.hcup-us.ahrq.gov/tech_assist/dua.jsp
2	Read and sign the HCUP DUA	www.hcup-us.ahrq.gov/tech_assist/centdist.jsp
3	Log in or register for an account and create your profile under “My Account”	
4	Submit online order and complete further instructions listed on the “Thank You” page.	
5	Download nationwide databases online or receive delivery of State databases through the mail.	

For assistance, contact the HCUP Central Distributor:
Email: hcup@ahrq.gov

Overview of HCUP Resources

What Types of Online Resources Does HCUP Have Available?

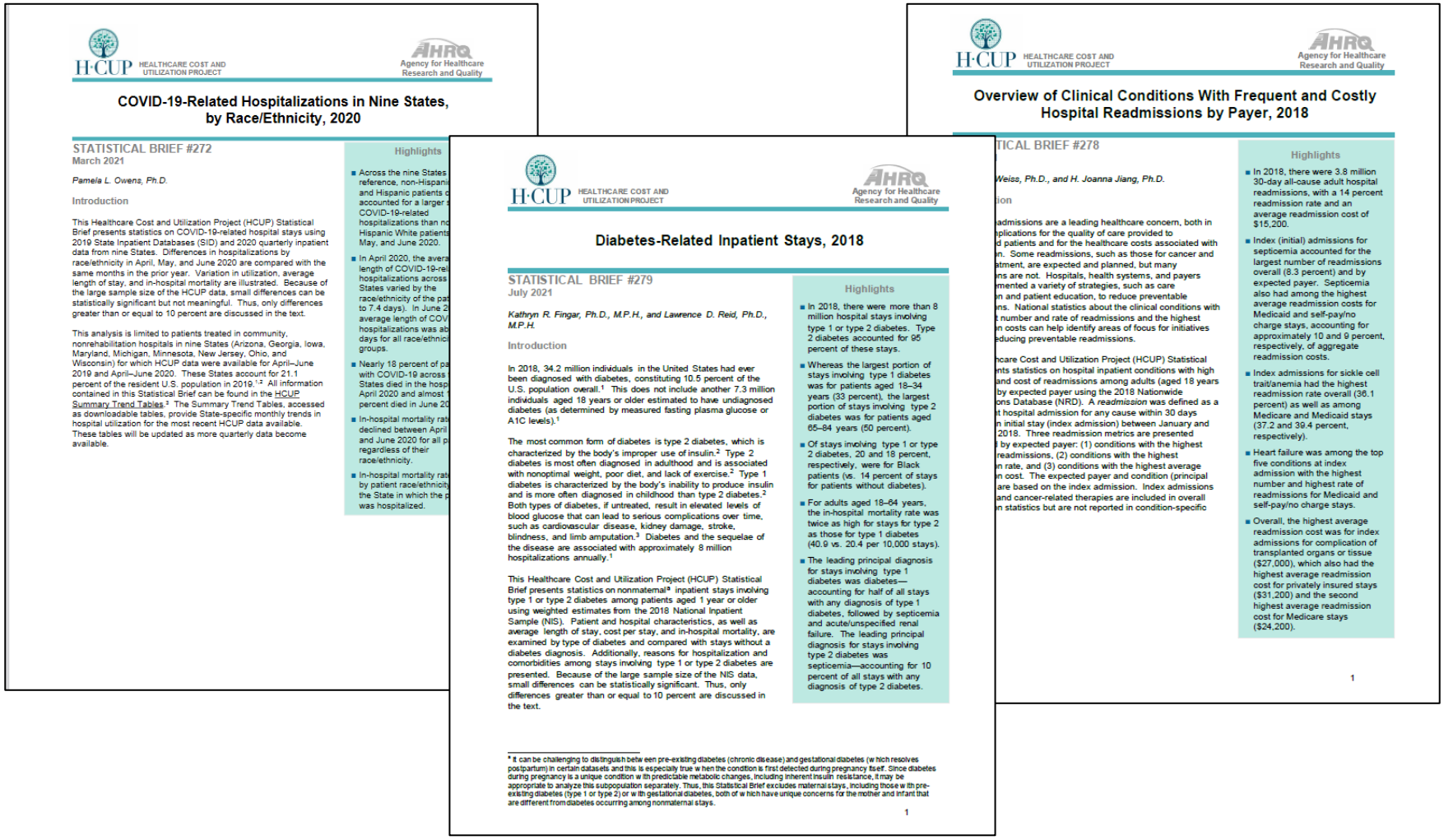
Types of HCUP Resources

- Analytic reports
  - Descriptive brief reports on select topics
  - Methodological reports to facilitate use of the HCUP databases
- Search option for publications based on HCUP databases
- Precalculated statistics
  - Online query tools
  - Topic-specific tables and figures
  - Database-specific information
- Data visualizations
  - Interactive visual displays of select HCUP data

Analytic Reports

What Types of Analytic Reports Does HCUP Offer?

Statistical Briefs Are Descriptive Reports on Specific Healthcare Topics



COVID-19-Related Hospitalizations in Nine States, by Race/Ethnicity, 2020

STATISTICAL BRIEF #272
March 2021

Pamela L. Owens, Ph.D.

Introduction

This Healthcare Cost and Utilization Project (HCUP) Statistical Brief presents statistics on COVID-19-related hospital stays using 2019 State Inpatient Databases (SID) and 2020 quarterly inpatient data from nine States. Differences in hospitalizations by race/ethnicity in April, May, and June 2020 are compared with the same months in the prior year. Variation in utilization, average length of stay, and in-hospital mortality are illustrated. Because of the large sample size of the HCUP data, small differences can be statistically significant but not meaningful. Thus, only differences greater than or equal to 10 percent are discussed in the text.

This analysis is limited to patients treated in community, nonrehabilitation hospitals in nine States (Arizona, Georgia, Iowa, Maryland, Michigan, Minnesota, New Jersey, Ohio, and Wisconsin) for which HCUP data were available for April–June 2019 and April–June 2020. These States account for 21.1 percent of the resident U.S. population in 2019.[1,2] All information contained in this Statistical Brief can be found in the HCUP Summary Trend Tables.[3] The Summary Trend Tables, accessed as downloadable tables, provide State-specific monthly trends in hospital utilization for the most recent HCUP data available. These tables will be updated as more quarterly data become available.

Highlights

- Across the nine States reference, non-Hispani and Hispanic patients accounted for a larger COVID-19-related hospitalizations than no Hispanic White patients May, and June 2020.
- In April 2020, the avera length of COVID-19-rel hospitalizations across States varied by the race/ethnicity of the pat to 7.4 days). In June 2 average length of COV hospitalizations was ab days for all race/ethnici groups.
- Nearly 18 percent of pa with COVID-19 across States died in the hosp April 2020 and almost percent died in June 20
- In-hospital mortality rat declined between April and June 2020 for all p regardless of their race/ethnicity.
- In-hospital mortality rat by patient race/ethnicity the State in which the p was hospitalized.

Diabetes-Related Inpatient Stays, 2018

STATISTICAL BRIEF #279
July 2021

Kathryn R. Fingar, Ph.D., M.P.H., and Lawrence D. Reid, Ph.D., M.P.H.

Introduction

In 2018, 34.2 million individuals in the United States had ever been diagnosed with diabetes, constituting 10.5 percent of the U.S. population overall.[1] This does not include another 7.3 million individuals aged 18 years or older estimated to have undiagnosed diabetes (as determined by measured fasting plasma glucose or A1C levels).[1]

The most common form of diabetes is type 2 diabetes, which is characterized by the body's improper use of insulin.[2] Type 2 diabetes is most often diagnosed in adulthood and is associated with nonoptimal weight, poor diet, and lack of exercise.[2] Type 1 diabetes is characterized by the body's inability to produce insulin and is more often diagnosed in childhood than type 2 diabetes.[2] Both types of diabetes, if untreated, result in elevated levels of blood glucose that can lead to serious complications over time, such as cardiovascular disease, kidney damage, stroke, blindness, and limb amputation.[3] Diabetes and the sequelae of the disease are associated with approximately 8 million hospitalizations annually.[1]

This Healthcare Cost and Utilization Project (HCUP) Statistical Brief presents statistics on nonmaternal* inpatient stays involving type 1 or type 2 diabetes among patients aged 1 year or older using weighted estimates from the 2018 National Inpatient Sample (NIS). Patient and hospital characteristics, as well as average length of stay, cost per stay, and in-hospital mortality, are examined by type of diabetes and compared with stays without a diabetes diagnosis. Additionally, reasons for hospitalization and comorbidities among stays involving type 1 or type 2 diabetes are presented. Because of the large sample size of the NIS data, small differences can be statistically significant. Thus, only differences greater than or equal to 10 percent are discussed in the text.

Highlights

- In 2018, there were more than 8 million hospital stays involving type 1 or type 2 diabetes. Type 2 diabetes accounted for 95 percent of these stays.
- Whereas the largest portion of stays involving type 1 diabetes was for patients aged 18–34 years (33 percent), the largest portion of stays involving type 2 diabetes was for patients aged 65–84 years (50 percent).
- Of stays involving type 1 or type 2 diabetes, 20 and 18 percent, respectively, were for Black patients (vs. 14 percent of stays for patients without diabetes).
- For adults aged 18–64 years, the in-hospital mortality rate was twice as high for stays for type 2 as those for type 1 diabetes (40.9 vs. 20.4 per 10,000 stays).
- The leading principal diagnosis for stays involving type 1 diabetes was diabetes—accounting for half of all stays with any diagnosis of type 1 diabetes, followed by septicemia and acute/unspecified renal failure. The leading principal diagnosis for stays involving type 2 diabetes was septicemia—accounting for 10 percent of all stays with any diagnosis of type 2 diabetes.

* It can be challenging to distinguish betw een pre-existing diabetes (chronic disease) and gestational diabetes (w hich resolves postpartum) in certain datasets and this is especially true w hen the condition is first detected during pregnancy itself. Since diabetes during pregnancy is a unique condition w ith predictable metabolic changes, including inherent insulin resistance, it may be appropriate to analyze this subpopulation separately. Thus, this Statistical Brief excludes maternal stays, including those w ith pre-existing diabetes (type 1 or type 2) or w ith gestational diabetes, both of w hich have unique concerns for the mother and infant that are different from diabetes occurring among nonmaternal stays.

Overview of Clinical Conditions With Frequent and Costly Hospital Readmissions by Payer, 2018

TICAL BRIEF #278

Weiss, Ph.D., and H. Joanna Jiang, Ph.D.

ion

admissions are a leading healthcare concern, both in plications for the quality of care provided to d patients and for the healthcare costs associated with n. Some readmissions, such as those for cancer and atment, are expected and planned, but many ns are not. Hospitals, health systems, and payers mented a variety of strategies, such as care n and patient education, to reduce preventable ns. National statistics about the clinical conditions with t number and rate of readmissions and the highest n costs can help identify areas of focus for initiatives educing preventable readmissions.

hcare Cost and Utilization Project (HCUP) Statistical nts statistics on hospital inpatient conditions with high and cost of readmissions among adults (aged 18 years by expected payer using the 2018 Nationwide ons Database (NRD). A *readmission* was defined as a t hospital admission for any cause within 30 days n initial stay (index admission) between January and 2018. Three readmission metrics are presented l by expected payer: (1) conditions with the highest readmissions, (2) conditions with the highest n rate, and (3) conditions with the highest average n cost. The expected payer and condition (principal are based on the index admission. Index admissions and cancer-related therapies are included in overall n statistics but are not reported in condition-specific

Highlights

- In 2018, there were 3.8 million 30-day all-cause adult hospital readmissions, with a 14 percent readmission rate and an average readmission cost of $15,200.
- Index (initial) admissions for septicemia accounted for the largest number of readmissions overall (8.3 percent) and by expected payer. Septicemia also had among the highest average readmission costs for Medicaid and self-pay/no charge stays, accounting for approximately 10 and 9 percent, respectively, of aggregate readmission costs.
- Index admissions for sickle cell trait/anemia had the highest readmission rate overall (36.1 percent) as well as among Medicare and Medicaid stays (37.2 and 39.4 percent, respectively).
- Heart failure was among the top five conditions at index admission with the highest number and highest rate of readmissions for Medicaid and self-pay/no charge stays.
- Overall, the highest average readmission cost was for index admissions for complication of transplanted organs or tissue ($27,000), which also had the highest average readmission cost for privately insured stays ($31,200) and the second highest average readmission cost for Medicare stays ($24,200).

www.hcup-us.ahrq.gov/reports/statbriefs/statbriefs.jsp

HCUP Findings-At-A-Glance Are Focused Reports on Select Topics

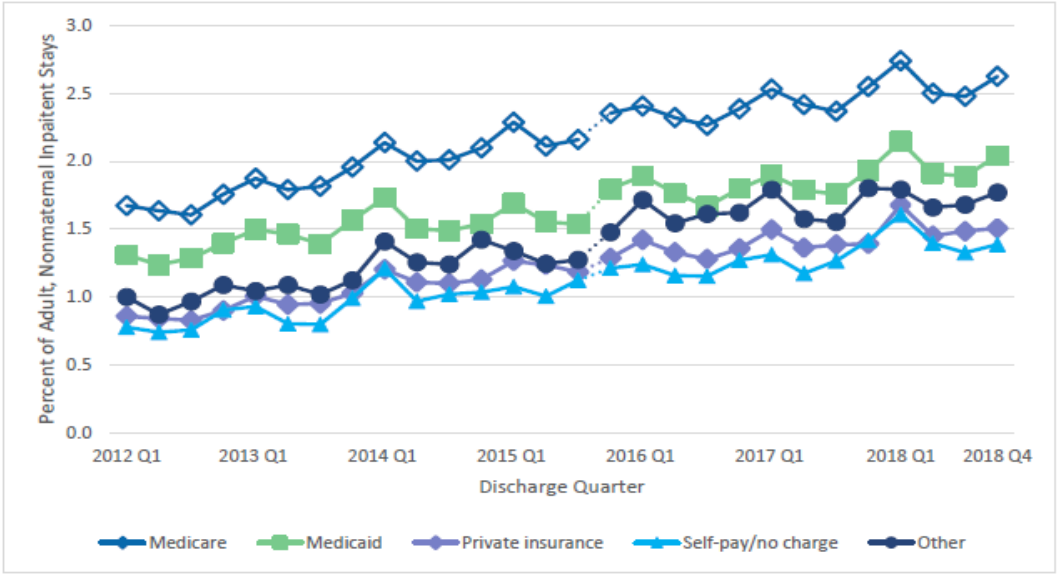
Table 1. Number of Adult, Nonmaternal Inpatient Stays with Any Diagnosis of *Clostridioides difficile*, 2011-2016 and 2019

Year	Rate of Any Diagnosis of *C. Diff* per 1,000 Adult, Nonmaternal discharges	95% confidence interval
2011	13.0	(12.7, 13.3)
2012	13.6	(13.3, 13.9)
2013	13.8	(13.6, 14.1)
2014	14.0	
2015 Q1-Q3	14.2	
2016	13.6	
2019	10.2	

Note: Additional analyses of national estimates overall (not
for *C. diff* declined each year.

Source: Agency for Healthcare Research and Quality (AHRQ
Inpatient Databases (SID) nationally weighted analysis file, 2
Q1–2015 Q3 and ICD-10-CM Diagnoses from 2016 and 2019

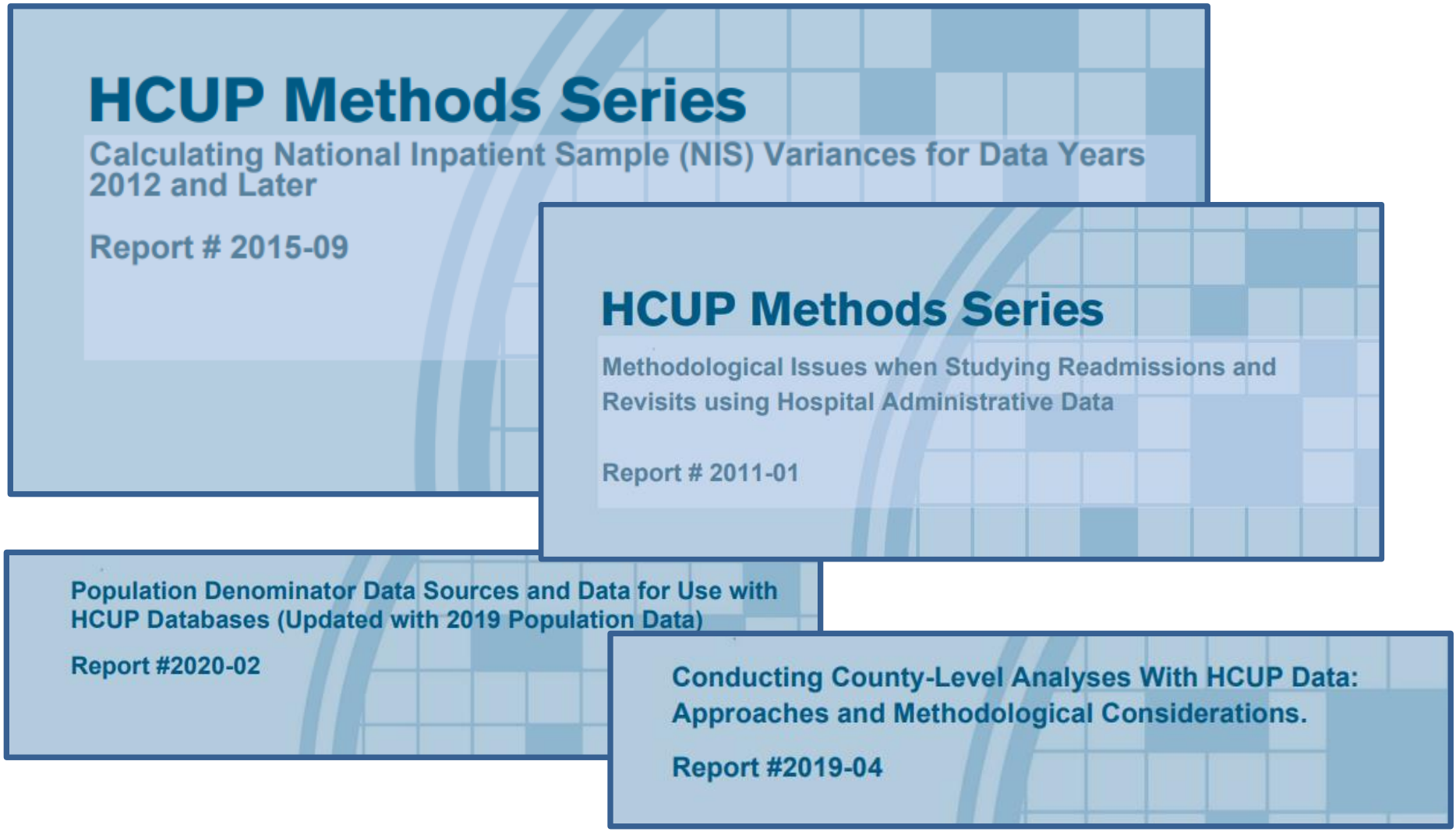
Figure 2b: Percent of Adult, Nonmaternal Inpatient Stays with a Diagnosis of Septic Shock, By Expected Primary Payer and Discharge Quarter, 2012-2018



Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), National Inpatient Sample (NIS), ICD-9-CM Diagnoses from 2012 Q1-2015 Q3 and ICD-10-CM Diagnoses from 2015 Q4-2018 Q4

www.hcup-us.ahrq.gov/reports/ataglance/findingsataglance.jsp

HCUP Methods Series Reports Provide Technical Guidance on Using HCUP Data



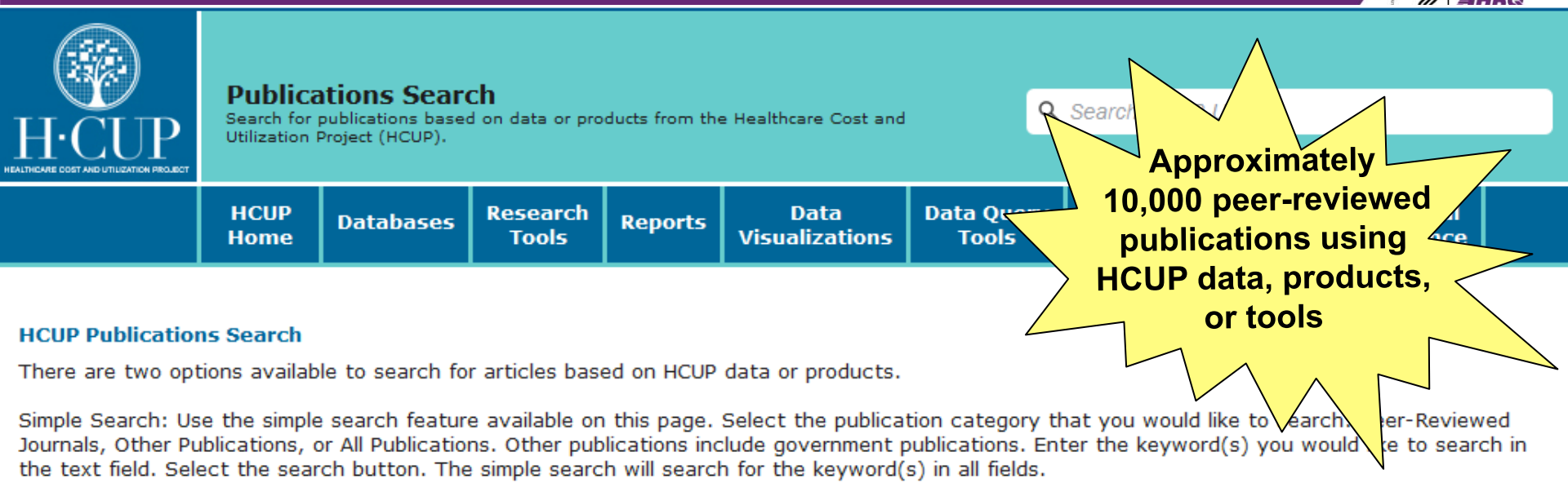
www.hcup-us.ahrq.gov/reports/methods/methods.jsp

Search Option for Publications That Use HCUP Databases

AHRQ Agency for Healthcare Research and Quality

What Is the HCUP Publications Search?

Search for Publications Using HCUP Databases



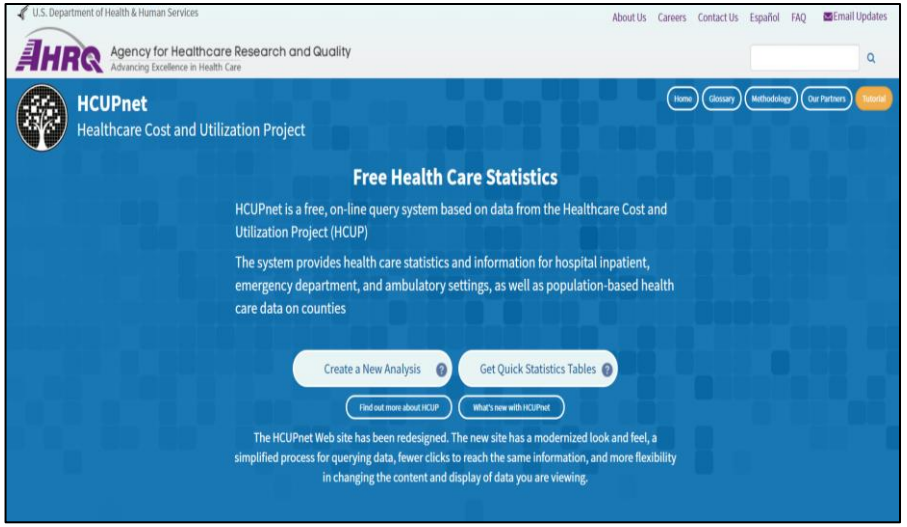
www.hcup-us.ahrq.gov/reports/pubsearch/pubsearch.jsp

Precalculated Statistics

What Precalculated Statistics Are Available?

HCUPnet Provides Quick, Free Access to HCUP Statistics

- Free online query system
- Users generate tables and figures of outcomes by diagnosis and procedure classifications
- Statistics can be cross-classified by patient and hospital characteristics
- Can produce county-level statistical maps



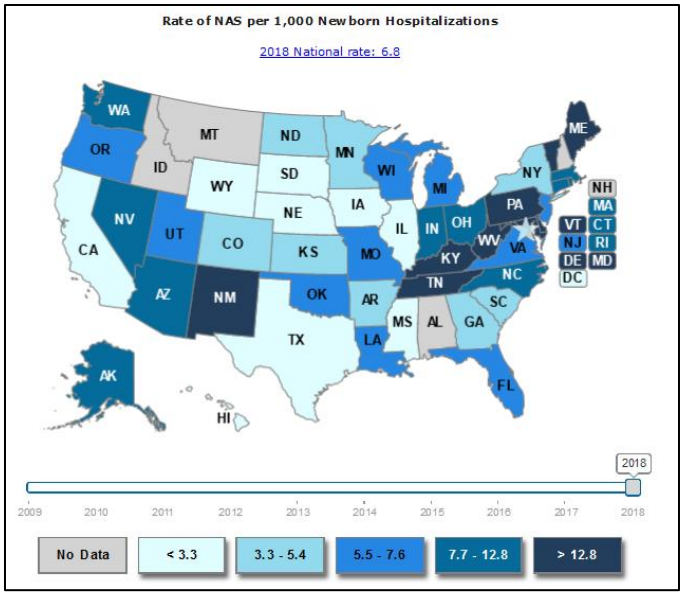
www.hcupnet.ahrq.gov/

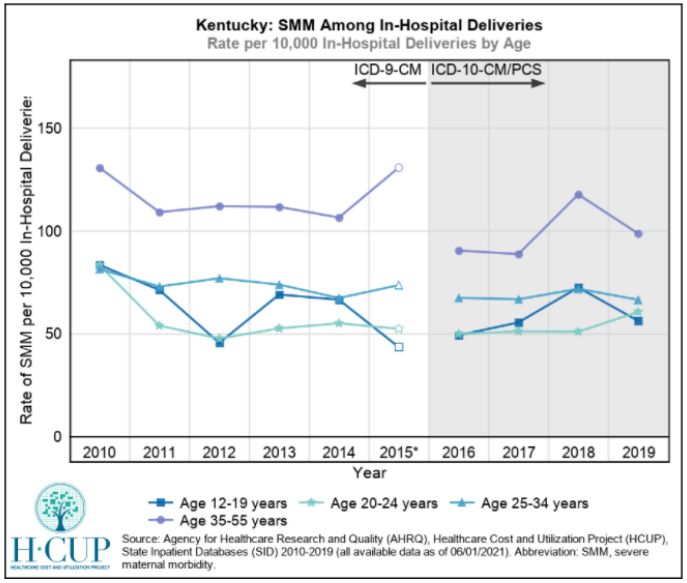
HCUP Fast Stats

- Uses visual displays to compare national or State statistics on a range of healthcare topics
  - ▶ Severe Maternal Morbidity
  - ▶ Neonatal Abstinence Syndrome
  - ▶ Opioid-Related Hospital Use
  - ▶ Hurricane Impact on Hospital Use
  - ▶ National Trends for Utilization Statistics and Costs
  - ▶ State Trends by Payer

New!

www.hcup-us.ahrq.gov/faststats/landing.jsp





New!

HCUP Summary Trend Tables

- Downloadable tables containing State-specific monthly trends for inpatient data
  - COVID-19 trends in 2020
  - Trends for other conditions starting in 2017 (e.g., maternal and neonatal conditions, mental and/or substance use disorders, injuries, surgeries, other medical conditions)
- Trends available for:
  - Number of inpatient stays
  - Percentage of total stays
  - Average length of stay
  - In-hospital mortality rate

www.hcup-us.ahrq.gov/reports/trendtables/summarytrendtables.jsp

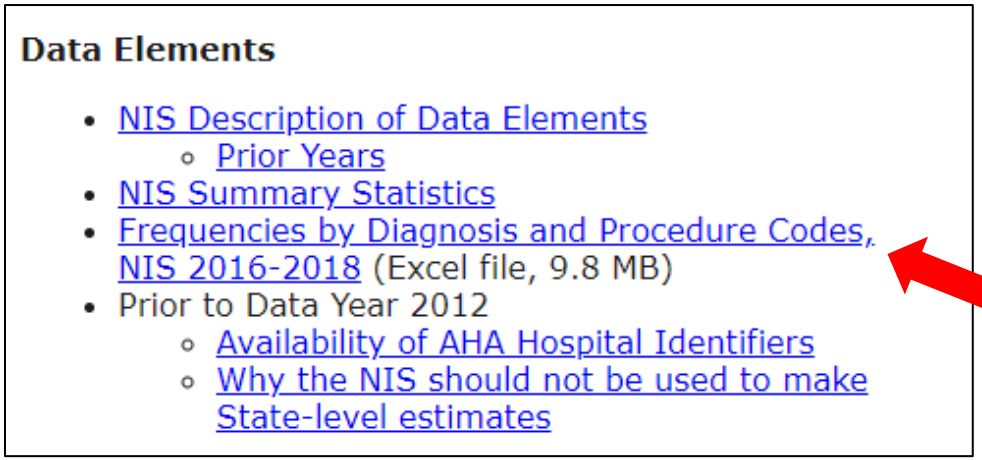
HCUP Summary Statistics

- Available for all HCUP databases by year
- Provide descriptive statistics for most data elements
- Use before purchase of HCUP database
  - Allows users to preview the type of information available in the respective HCUP database
- Use after purchase of HCUP database
  - Allows users to validate results
- Found under database-specific documentation pages of HCUP-US website

www.hcup-us.ahrq.gov/databases.jsp

Diagnosis and Procedure Frequency Tables

- Frequencies of International Classification of Diseases, Tenth Revision, Clinical Modification/Procedure Coding System (ICD-10-CM/PCS) codes (individually and grouped by clinical category)
- Available for the HCUP nationwide databases (NIS, KID, NASS, NEDS, NRD)
  - Under **"Data Elements"** section of the respective Database Documentation pages



www.hcup-us.ahrq.gov/databases.jsp

HCUP's Precalculated Statistics Meeting Varying Analytic Needs

Consideration	Analytic Need	HCUP Resource(s)
Type of information	Diagnosis- or procedure-specific information	HCUPnet HCUP Fast Stats HCUP Summary Trend Tables HCUP Diagnosis and Procedure Frequency Tables
	Other healthcare topics (e.g., hurricane-related ED visits)	HCUP Fast Stats
	Database-specific information	HCUP Summary Statistics

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	Database-specific information	HCUP Summary Statistics
Display	**Graphics (e.g., charts, maps)**	**HCUPnet** **HCUP Fast Stats**
	Downloadable tables	**HCUPnet** **HCUP Fast Stats** **HCUP Summary Trend Tables** **HCUP Diagnosis and Procedure Frequency Tables**

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Quality control	**Validate analytic output based on HCUP database(s)**	**HCUPnet** **HCUP Summary Statistics** **HCUP Diagnosis and Procedure Frequency Tables**

HCUP's Precalculated Statistics Meeting Varying Analytic Needs

Consideration	Analytic Need	HCUP Resource(s)
Type of information	Diagnosis- or procedure-specific information	HCUPnet HCUP Fast Stats HCUP Summary Trend Tables HCUP Diagnosis and Procedure Frequency Tables
	Other healthcare topics (e.g., hurricane-related ED visits)	HCUP Fast Stats
	Database-specific information	HCUP Summary Statistics
Display	Graphics (e.g., charts, maps)	HCUPnet HCUP Fast Stats
	Downloadable tables	HCUPnet HCUP Fast Stats HCUP Summary Trend Tables HCUP Diagnosis and Procedure Frequency Tables
Quality control	Validate analytic output based on HCUP database(s)	HCUPnet HCUP Summary Statistics HCUP Diagnosis and Procedure Frequency Tables
Flexibility	**Predetermined stratifiers (e.g., patient characteristics)**	**HCUPnet** **HCUP Fast Stats** **HCUP Summary Trend Tables**
	Multiple query options	**HCUPnet** **HCUP Fast Stats**

HCUP Data Visualizations

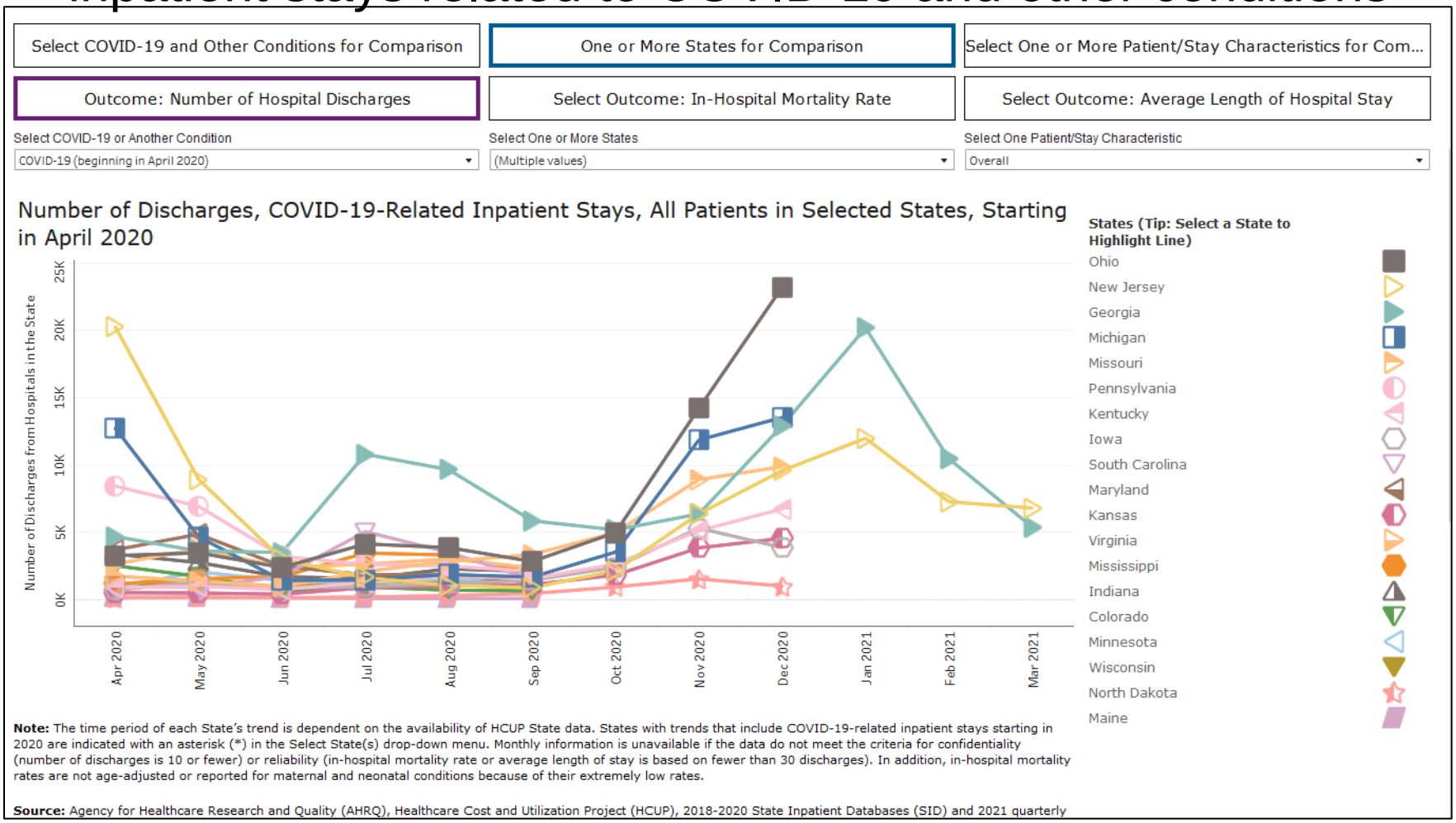
What HCUP Data Visualizations Are Available?

HCUP Visualization of Inpatient Trends in COVID-19 and Other Conditions

New!

AHRQ Agency for Healthcare Research and Quality

Interactive visual display of State-specific monthly trends in inpatient stays related to COVID-19 and other conditions



www.hcup-us.ahrq.gov/datavisualizations/covid-19-inpatient-trends.jsp

What Are the HCUP Software Tools?

HCUP Software Tools Augment HCUP and Other Administrative Databases

- May be applied to HCUP and other administrative databases
- Create new data elements from existing data, thereby enhancing a researcher's ability to conduct analyses
- Available for different coding systems, which vary based on setting of care (e.g., inpatient and outpatient)
- Apply to either diagnosis codes or procedure codes

www.hcup-us.ahrq.gov/tools_software.jsp

Types of Diagnosis Codes Included in HCUP Databases

Diagnosis Coding Systems

- **ICD-10-CM** (International Classification of Diseases, Tenth Revision, Clinical Modification)
  - Implemented in the United States starting on October 1, 2015
  - Included on inpatient and outpatient data
- **ICD-9-CM** (International Classification of Diseases, Ninth Revision, Clinical Modification)
  - Used in the United States prior to October 1, 2015
  - Included on inpatient and outpatient data

Diagnosis-related tools are similar in concept across the coding systems but differ in methodology

- Should not be used to trend between ICD-9-CM and ICD-10-CM

ICD-10-CM Diagnosis-Related HCUP Software Tools

Need to identify clinical categories that encompass similar codes?

→ **Clinical Classifications Software Refined (CCSR) for ICD-10-CM diagnoses**

Want to identify comorbidities?

→ **Elixhauser Comorbidity Software Refined for ICD-10-CM**

Need to identify diagnoses indicating chronic conditions?

→ **Chronic Condition Indicator Refined (CCIR) for ICD-10-CM**

These tools apply to both inpatient and outpatient data

Types of Procedure Codes Included in HCUP Databases

Procedure Coding Systems

- **ICD-10-PCS** (International Classification of Diseases, Tenth Revision, Procedure Coding System)
  - Implemented in the United States starting on October 1, 2015
  - Reported only on inpatient data
- **ICD-9-CM**
  - Used in the United States prior to October 1, 2015
  - Reported on inpatient data and sometimes on outpatient data
- **HCPCS** (Healthcare Common Procedure Coding System)
  - **Level I CPT** (Current Procedural Terminology)
  - **HCPCS Level II**
  - Available in all data years
  - Applicable to outpatient procedures and physician services

Procedure-related tools are similar in concept across the coding systems but differ in methodology

- Should not be used to trend between ICD-9-CM and ICD-10-PCS or ICD-10-PCS and CPT/HCPCS Level II

ICD-10-PCS Procedure-Related HCUP Software Tools

Need to identify inpatient procedure categories that encompass similar codes?

Clinical Classifications Software Refined (CCSR) for ICD-10-PCS procedures

Want to identify therapeutic or diagnostic operating room procedures?

Procedure Classes Refined for ICD-10-PCS

These tools apply to only inpatient data

CPT and HCPCS Level II Procedure-Related HCUP Software Tools

Need to identify procedure categories that encompass similar CPT and HCPCS Level II codes?

↓

Clinical Classifications Software (CCS) for Services and Procedures

Want to identify CPT procedures by use of operating room and degree of invasiveness?

↓

Surgery Flags Software for Services and Procedures

These tools apply to only outpatient data and require users to agree to the license for use of CPT

Summary of HCUP Software Tool Availability

HCUP Software Tool Purpose	ICD-10-CM/PCS	ICD-9-CM	CPT/HCPCS Level II Codes
Diagnosis-related tools			
Groups diagnoses into categories	CCSR for ICD-10-CM	CCS for ICD-9-CM	
Identifies comorbidities	Elixhauser Comorbidity Software Refined for ICD-10-CM	Elixhauser Comorbidity Software for ICD-9-CM	
Identifies chronic conditions	CCIR for ICD-10-CM [coming soon]	CCI for ICD-9-CM	

Summary of HCUP Software Tool Availability

HCUP Software Tool Purpose	ICD-10-CM/PCS	ICD-9-CM	CPT/HCPCS Level II Codes
Procedure-related tools			
Groups procedures into categories	CCSR for ICD-10-PCS	CCS for ICD-9-CM	CCS-Services and Procedures
Identifies operating room procedures	Procedure Classes Refined for ICD-10-PCS	Procedure Classes for ICD-9-CM	
Identifies specific services		Utilization Flags for Revenue Center Codes and ICD-9-CM	
Identifies procedures by use of operating room and invasiveness		Surgery Flags Software for ICD-9-CM	Surgery Flags Software for Services and Procedures

Latest HCUP Software Tool Releases

- Visit the Research Tools page of HCUP-US for additional information about tool versions:

  www.hcup-us.ahrq.gov/tools_software.jsp

  - Visit this web page regularly to ensure the most recent tool version is being applied to your administrative data

- Subscribe to the HCUP mailing list for notifications about tool releases:

  www.subscriptions.ahrq.gov/accounts/USAHRQ/subscriber/new?topic_id=USAHRQ_65

HCUP Technical Assistance

What Should You Do If You Have Questions About HCUP?

Additional HCUP Resources

- HCUP User Support website (HCUP-US):
  www.hcup-us.ahrq.gov
- Extensive HCUP database documentation
  www.hcup-us.ahrq.gov/databases.jsp
- Interactive online tutorials and training courses:
  www.hcup-us.ahrq.gov/techassist.jsp
- Technical assistance team email:
  hcup@ahrq.gov

Workshop Agenda Day 1

Topic	Duration	Start Time (PST/EST)
Introduction of HCUP	60 min	9:00 a.m./12:00 p.m.
HCUP Tools for ICD-10-PCS Procedures	60 min	10:00 a.m./1:00 p.m.
Q&A	10 min	11:00 a.m./2:00 p.m.
Break	10 min	11:10 a.m./2:10 p.m.
HCUP Tools for CPT® and HCPCS Level II Codes	40 min	11:20 a.m./2:20 p.m.
How to decide which procedure tool is best suited for your study?	5 min	12:00 p.m./3:00 p.m.
Brief introduction to resources on the HCUP-US website	5 min	12:05 p.m./3:05 p.m.
Q&A	15 min	12:10 p.m./3:10 p.m.

CCSR for ICD-10-PCS Procedures

What Is the CCSR for ICD-10-PCS Procedures?

CCSR for ICD-10-PCS Procedures Identifies Broad Procedure Categories

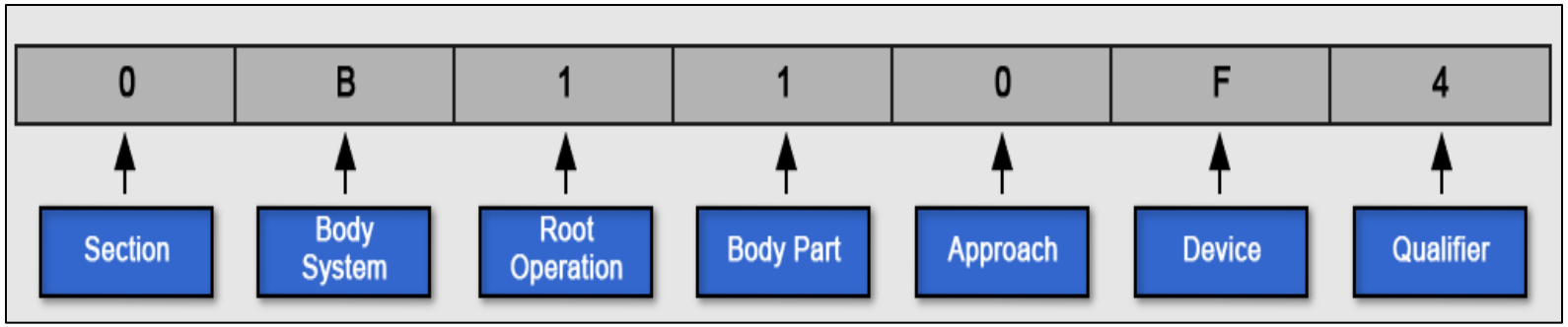
- CCSR for ICD-10-PCS categories:
  - Capitalize on the taxonomy and specificity of the ICD-10-PCS coding scheme
  - Retain the surgical concepts from the CCS for ICD-9-CM, when possible
- Applies only to inpatient data

Structure of the CCSR for ICD-10-PCS Procedures

- 31 high-level groupings (i.e., clinical domains) identified by first three characters of the CCSR category
  - Examples:
    - CAR Cardiovascular procedures
    - NCM Nuclear medicine
- 326 CCSR categories with six-character identifiers
  - Examples:
    - CAR003 Coronary artery bypass grafts (CABG)
    - NCM001 Planar nuclear medicine imaging

Grouping of Codes Into CCSR Categories Relied on ICD-10-PCS Taxonomy

- In ICD-10-PCS, each character of the seven-character codes has a specific meaning



How ICD-10-PCS Taxonomy Guided CCSR Category Assignment

- CCSR categories in each clinical domain were often created based on Root Operation and Body Part
- CCSR categories were at times further divided by Approach and Qualifier
- Diagnostic (ICD-10-PCS procedure codes with a seventh character of “X”) and therapeutic procedures are generally not mixed in the same CCSR category

Essential Guidelines for Assigning Procedures to CCSR Categories

- Each ICD-10-PCS code is assigned to one and only one CCSR category
- When possible, categories should capture known procedures
  - Includes high-volume procedures and low-volume/high-impact procedures (e.g., transplant)
- Category descriptions provide a clinically relevant name that represents most of the codes in the category, avoiding PCS terminology not used by clinicians
  - For example, using “biopsy” instead of “diagnostic drainage, excision, and extraction”

What Do I Need to Apply This Software Tool to My Data?

Specific Data Elements Are Required on Your Input Dataset

Required Data Elements for the CCSR for ICD-10-PCS
Unique record identifier used to link files
Array of ICD-10-PCS procedures*

* The CCSR includes ICD-10-PCS procedure codes valid as of October 2015 through current fiscal year

CCSR for ICD-10-PCS Procedures

How Is the CCSR Different From the CCS for ICD-9-CM?

CCSR for ICD-10-PCS and CCS for ICD-9-CM Similar Intent, Different Methodology

- Key similarities between CCSR for ICD-10-PCS and CCS for ICD-9-CM include:
  - Classifies procedures into categories based on surgical concepts
  - Mutually exclusive assignment
  - Provides a means by which to identify specific types of surgeries using procedure codes
  - Can be used analytically to examine patterns in healthcare cost, utilization, and outcomes, in addition to performing rank utilization by types of procedures
- The following slides detail specific differences between the tool versions

Difference #1: CCSR Category Name Identifies Clinical Domain

Category Related to Spinal Fusion

- <u>CCS for ICD-9-CM procedures</u>
  - Categories are numeric

CCS 158

- <u>CCSR for ICD-10-PCS</u>
  - Categories start with three-character clinical domain abbreviation followed by three digits

CCSR MST013

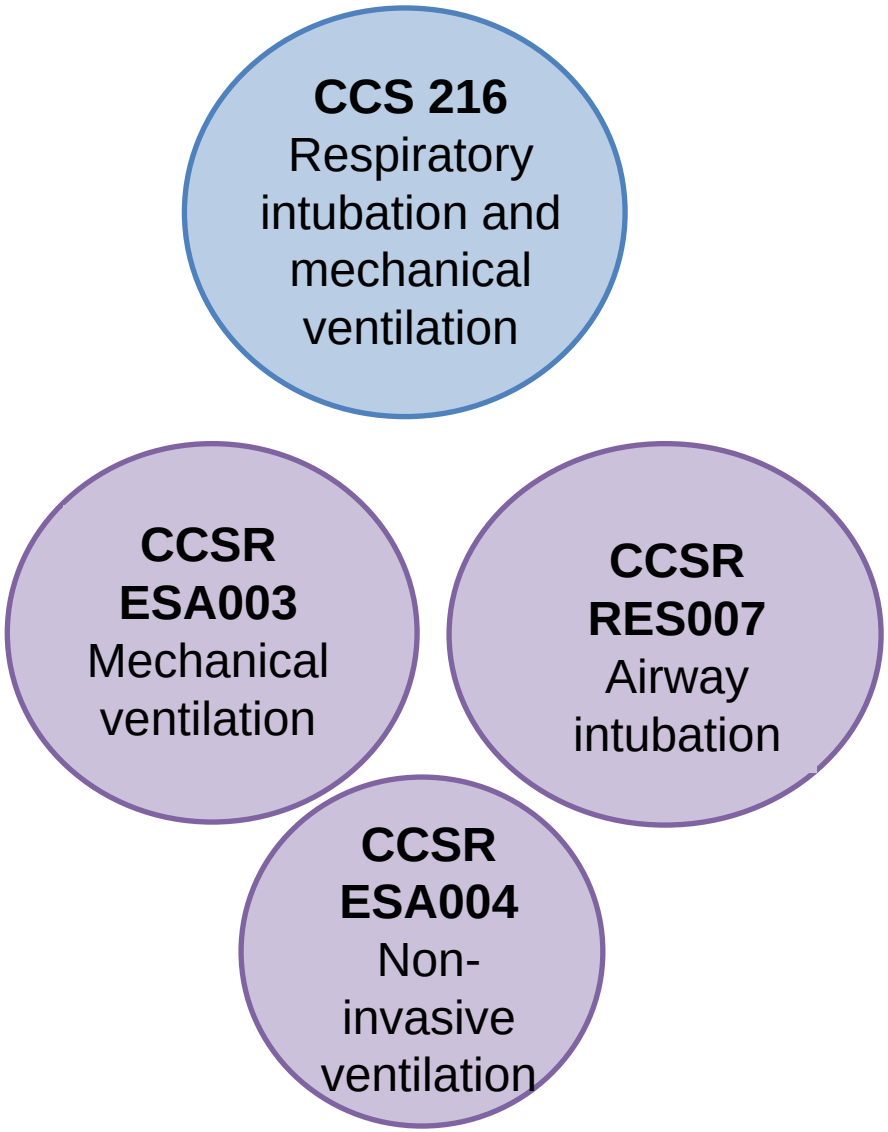
MST identifies the clinical domain of Musculoskeletal, Subcutaneous Tissue, and Fascia Procedures

013 identifies this as the spine fusion category under the MST clinical domain

Difference #2: More Specificity in the CCSR Categories

- CCS for ICD-9-CM procedures
  - 231 categories

- CCSR for ICD-10-PCS
  - 326 categories
  - More clinically specific categories
  - Fewer categories named "other procedures"



Difference #3: Output From SAS Software

- CCS for ICD-9-CM procedures
  - SAS mapping program created an array of CCS data elements with the CCS category as the value
  - There was one CCS data element for each procedure data element on a record
- CCSR for ICD-10-PCS
  - Allows users the flexibility to choose between output files structured vertically or horizontally
    - Vertical output file
      - Efficient storage
      - Good option for experienced programmers
    - Horizontal output file
      - Straightforward practical application
      - Good option for novice programmers or narrow clinical focus

CCSR for ICD-10-PCS Procedures

What ICD-10-PCS Coding Guidelines Should I Take Into Consideration Before Using the CCSR?

Coding of the Principal Procedure

- Per ICD-10-PCS Coding Guidelines: Sequence procedure performed for definitive treatment most related to principal diagnosis as principal procedure
- Concept differs from principal diagnosis (condition established after study to be chiefly responsible for occasioning the admission of the patient to the hospital)
  - In some cases, the principal procedure may not be the reason for admission

In ICD-10-PCS, Surgery May Need To Be Defined by Multiple Procedure Codes

- Submittal forms are not designed to identify multiple ICD-10-PCS codes that might be required to define the principal surgery
- In some cases, the CCSR categories handle this issue because clinically similar codes are included in the same category

Examples of When CCSR Includes Codes Needed To Identify a Common Surgery

Surgery	Combination ICD-10-PCS Codes	CCSR Category
Coronary bypass	021109W: Bypass Coronary Artery, Two Arteries from Aorta with Autologous Venous Tissue, Open Approach	CAR003: Coronary artery bypass grafts (CABG)
	02100Z9: Bypass Coronary Artery, One Artery from Left Internal Mammary, Open Approach	CAR003: Coronary artery bypass grafts (CABG)
Tonsillectomy and adenoidectomy	0CTPXZZ: Resection of Tonsils, External Approach	ENT007: Tonsillectomy and adenoidectomy
	0CTQXZZ: Resection of Adenoids, External Approach	ENT007: Tonsillectomy and adenoidectomy
Percutaneous transluminal coronary angioplasty (PTCA) with atherectomy	02C03ZZ: Extirpation of Matter from Coronary Artery, One Artery, Percutaneous Approach	CAR003: Percutaneous coronary interventions (PCI)
	027034Z: Dilation of Coronary Artery, One Artery with Drug-eluting Intraluminal Device, Percutaneous Approach	CAR003: Percutaneous coronary interventions (PCI)
	02713EZ: Dilation of Coronary Artery, Two Arteries with Two Intraluminal Devices, Percutaneous Approach	CAR003: Percutaneous coronary interventions (PCI)

Example of When CCSR Does Not Include Codes Needed To Identify a Surgery

Surgery	Combination ICD-10-PCS Codes	CCSR Category
Norwood procedure for hypoplastic heart syndrome	021K0ZW: Bypass Right Ventricle to Aorta, Open Approach	CAR013: Heart and great vessel bypass procedures
	02UX0KZ: Supplement Thoracic Aorta, Ascending/Arch with Nonautologous Tissue Substitute, Open Approach	CAR012: Vessel repair and replacement
	021Q0JB: Bypass Right Pulmonary Artery from Subclavian with Synthetic Substitute, Open Approach	CAR013: Heart and great vessel bypass procedures
	02LR0ZT: Occlusion of Ductus Arteriosis, Open Approach	CAR010: Ligation and embolization of vessels
	02160Z7: Bypass Right Atrium to Left Atrium, Open Approach	CAR013: Heart and great vessel bypass procedures

CCSR for ICD-10-PCS Procedures

How Should the CCSR for ICD-10-PCS Be Used?

Recommendations for Reporting Procedure Volume by CCSR

- Use either the **principal procedure or any-listed procedure** categorized by CCSR for reporting procedure volume or population-based rates
- It is important for the interpretation of results to reflect what is reported
  - Are you enumerating patients who were admitted to the hospital for a procedure to treat a specific principal condition (principal) or examining total procedure volume (any-listed)?

Caution when reporting by any-listed procedure CCSR: if two ICD-10-PCS codes on the same inpatient record map to the same CCSR category, be careful to only count the record once.

Examples of Variation in Procedure Volume by Procedure Position

Number of Inpatient Stays in the United States by CCSR Category

Location of CCSR Category	Cesarean Section (CCSR PGN003)	Cardiac and Coronary Fluoroscopy (CCSR IMG001)
Principal procedure	1,150,205	73,620
Any-listed procedure	1,167,660	1,069,170
Percentage of records captured by the principal procedure CCSR	98.5	6.9

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), National Inpatient Sample (NIS), 2018.

There can be a significant difference in the number of inpatient stays when counting discharges within a CCSR by principal procedure versus any-listed procedure

Recommendations for Reporting Outcomes by CCSR

- Use **only the principal procedure** categorized by CCSR for reporting estimates of resources or outcomes:
  - Length of stay
  - Total hospital charges or total hospital costs[1]
  - In-hospital mortality rates
  - Readmission rates
- Limit to operating room (OR) procedures
  - Represents a relatively homogeneous group of patients

[1] Total hospital charges/costs are indicative of the entire hospital stay and not specific to the principal procedure

Example of Variation in Outcomes by Procedure Position

Example for Appendectomy Procedures Defined by CCSR GIS008

Location of CCSR Category	Average Length of Stay, Days	Average Total Cost, $	In-Hospital Mortality Rate per 100 Discharges
Principal procedure	3.09	12,404	0.16
Only listed as a secondary procedure	9.97	35,482	1.63
Any-listed procedure	4.50	17,141	0.46

Length of stay and cost about 3 times higher than when CCSR is principal

Length of stay and cost about 1.5 times higher than when CCSR is principal

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), National Inpatient Sample (NIS), 2018.

Appendectomies

- When CCSR of appendectomy is the principal procedure:
  - 88.5 percent of U.S. discharges have a principal diagnosis of Appendicitis and Other Appendiceal Conditions (CCSR DIG009 for diagnoses)
- When CCSR of appendectomy is only a secondary procedure:
  - Top three principal diagnosis CCSRs in the United States are:
    - Diverticulosis and Diverticulitis (DIG013)
    - Intestinal Obstruction and Ileus (DIG012)
    - Female Reproductive System Cancers – Ovary (NEO033)
  - These cases are not representative of a typical stay in which a patient has come to the hospital in need of an appendectomy
    - The appendectomy is secondary to the reason for admission

Summary of Recommendations for Reporting Utilization Statistics by CCSR

- Report procedure volume based on **either the principal or any-listed procedure CCSR** depending on analytic purpose
- Report the statistic based on **the principal procedure CCSR** for estimates of resources (length of stay, total charges, total costs), in-hospital mortality rates, or readmissions
  - Limit to operating room procedures using the Procedure Classes Refined for ICD-10-PCS

CCSR for ICD-10-PCS

AHRQ Agency for Healthcare Research and Quality

What Are the Top Five Most Common Procedures by Patient Age Group?

Consideration: Principal Versus Any-Listed Procedure

- Depends on analytic purpose
  - For this use case, interest is on total procedure volume for each of our five age groups (0-17, 18-44, 45-64, 65-74, and 75+)
- Analyses focused on specific procedure treating principal condition or certain outcomes (i.e., total charges/costs, in-hospital mortality rates) should use principal procedure

Consideration: Maternal/Neonatal Inpatient Stays

- When reporting on procedures (and diagnoses), you may want to consider limiting to nonmaternal/nonneonatal stays
  - These stays represent roughly a quarter of the 2019 NIS
  - Several data elements in HCUP databases available to use:
    - I10_BIRTH and I10_DELIVERY
    - MDC_NoPOA = 14 (Pregnancy, Childbirth & The Puerperium) or 15 (Newborns & Other Neonates with Conditions Originating in Prenatal Period)

Use Case: Most Common Procedures

Most Common Procedures, Age 0-17 Years

Rank	All-Listed Procedures	Number of Inpatient Stays	Percent of Inpatient Stays, Ages 0-17
1	ADM010: Vaccinations	1,201,035	23.1
2	MRS001: Circumcision	961,915	18.5
3	ENT004: Diagnostic audiology	270,180	5.2
4	EST002: Phototherapy	246,910	4.7
5	ESA004: Non-invasive ventilation	190,365	3.7

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), National Inpatient Sample (NIS), 2019.

The procedures above are predominantly classified as minor diagnostic or minor therapeutic procedures and there is a chance these are underreported.

Use Case: Most Common Procedures

Most Common Procedures, Age 18-44 Years, Maternal Stays Included

Rank	All-Listed Procedures	Number of Inpatient Stays	Percent of Inpatient Stays, Ages 18-44
1	PGN002: Spontaneous vaginal delivery	2,259,939	27.0
2	PGN003: Cesarean section	1,128,950	13.5
3	PGN004: Assisted vaginal delivery	1,074,425	12.9
4	MST021: Perineal muscle laceration repair (2nd degree obstetrical and other)	673,655	8.1
5	ADM007: Intravenous induction of labor	670,605	8.0

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), National Inpatient Sample (NIS), 2019.

The list of procedures for this age group would be very different if maternal cases were excluded.

Use Case: Most Common Procedures

Most Common Procedures, Age 18-44 Years, Maternal Stays Excluded

Rank	All-Listed Procedures	Number of Inpatient Stays	Percent of Inpatient Stays, Ages 18-44
1	CAR024: Venous and arterial catheter placement	293,320	3.5
2	ESA003: Mechanical ventilation	167,895	2.0
3	ADM001: Transfusion of blood and blood products	154,275	1.8
4	IMG008: Ultrasonography	122,555	1.5
5	RES007: Airway intubation	119,630	1.4

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), National Inpatient Sample (NIS), 2019.

Use Case: Most Common Procedures

Most Common Procedures, Age 45+ Years

All-Listed Procedures	Age 45-64 Years		Age 65-74 Years		Age 75+ Years	
	Rank	Percent of Inpatient Stays	Rank	Percent of Inpatient Stays	Rank	Percent of Inpatient Stays
CAR024: Venous and arterial catheter placement	1	8.5	1	8.5	1	6.9
IMG001: Cardiac and coronary fluoroscopy	2	5.0	3	5.5	4	5.8
MAM005: Measurement during cardiac catheterization	3	4.9	5	5.4	5	4.7
IMG008: Ultrasonography	4	4.6	4	5.2	3	3.7
ADM001: Transfusion of blood and blood products	5	4.5	2	5.1	2	3.5

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), National Inpatient Sample (NIS), 2019.

Procedure Classes Refined for ICD-10-PCS

AHRQ Agency for Healthcare Research and Quality

What Is the Procedure Classes Refined for ICD-10-PCS?

Procedure Classes Refined for ICD-10-PCS Identifies OR Procedures

- Procedure Classes Refined for ICD-10-PCS facilitates health services research by allowing the researcher to readily determine:
  - Whether a procedure is diagnostic or therapeutic
  - Whether a procedure is expected to be performed in an operating room
- Applies only to inpatient data

Procedure Class Definitions

- Identification of minor versus major procedures
  - A major surgery is tied to the expectation that the procedure would be performed in an operating room
  - Procedure codes are identified as major based on the ICD-10-PCS list of OR procedures included in the AHRQ Quality Indicator (QI) software
- Identification of therapeutic versus diagnostic procedures
  - Classification of diagnostic and therapeutic procedures was determined either by the taxonomy of the ICD-10-PCS code or ICD-10-PCS clinical coding experts

Procedure Class: Minor Diagnostic

- Minor diagnostic
  - Non-operating room procedures that are diagnostic
- Examples:
  - Ultrasounds
  - Diagnostic audiology
  - Electrocardiogram

Procedure Class: Minor Therapeutic

- Minor therapeutic
  - Non-operating room procedures that are therapeutic
- Examples:
  - Blood transfusion
  - Vaccinations
  - Labor induction

Procedure Class: Major Diagnostic

- Major diagnostic
  - Operating room procedures that are performed for diagnostic reasons
- Examples:
  - Heart biopsy
  - Lymph node biopsy
  - Bone and joint biopsy

Procedure Class: Major Therapeutic

- Major therapeutic
  - Operating room procedures that are performed for therapeutic reasons
- Examples:
  - Coronary artery bypass grafts
  - Percutaneous coronary interventions
  - Hysterectomy

Procedure Classes Refined for ICD-10-PCS

What Do I Need to Apply This Software Tool to My Data?

Specific Data Elements Are Required on Your Input Dataset

Required Data Elements for the Procedure Classes Refined for ICD-10-PCS
Array of ICD-10-PCS procedures used to assign procedure classes*

* The Procedure Classes tool includes ICD-10-PCS procedure codes valid as of October 2015 through current fiscal year

Procedure Classes Refined for ICD-10-PCS

Using the Procedure Classes Refined for ICD-10-PCS With the CCSR for ICD-10-PCS

Example of Variation in Principal Diagnosis for Non-OR Procedure

Principal Procedure CCSR	Total N Principal Procedure CCSR	Principal Diagnosis CCSR	Total N Principal Diagnosis CCSR	Percentage of Total Principal Procedure CCSR
MST006 Knee arthroplasty	705,378	MUS 006 Osteoarthritis	620,819	88
ADM001 Transfusion of blood and blood products	429,215	DIG021 Gastrointestinal hemorrhage	35,320	8
	429,215	BLD001 Nutritional anemia	30,915	7
	429,215	BLD003 Aplastic anemia	21,180	5
	429,215	BLD005 Sickle cell trait/anemia	19,555	5
	429,215	CIR019 Heart Failure	18,005	4

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), National Inpatient Sample (NIS), 2018.

Procedure Classes Refined for ICD-10-PCS

What Are the Top Five Most Common Operating Room Procedures by Patient Age Group?

Limiting to Operating Room Procedures

- Use case for CCSR for ICD-10-PCS provided top 5 most common procedures for select age groups
  - Procedures were predominantly minor diagnostic or therapeutic
- Can use CCSR for ICD-10-PCS with Procedure Classes Refined for ICD-10-PCS to limit reporting to operating room procedures only
- Limiting to OR procedures results in relatively homogeneous group of patients that came to the hospital for similar treatment
  - Unlike minor procedures, OR procedures are not underreported because they are used for reimbursement

Use Case: Most Common Operating Room Procedures

Most Common Operating Procedures, Age 0-17 Years

Rank	All-Listed Operating Room Procedures	Number of Inpatient Stays	Percent of Inpatient Stays, Ages 0-17
1	GIS008: Appendectomy	41,455	0.8
2	MST012: Bone fixation (excluding extremities)	18,075	0.3
3	MST030: Musculoskeletal procedures, NEC	14,385	0.3
4	MST010: Femur fixation	13,310	0.3
5	MST013: Spine fusion	12,900	0.2

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), National Inpatient Sample (NIS), 2019.

Prior to limiting to OR procedures, top 5 CCSR categories for this age group included vaccinations, circumcision, diagnostic audiology, phototherapy and non-invasive ventilation.

Use Case: Most Common Operating Room Procedures

Most Common Operating Room Procedures, Age 18-44 Years, Maternal Stays Included

Rank	All-Listed Operating Room Procedures	Number of Inpatient Stays	Percent of Inpatient Stays, Ages 18-44
1	PGN003: Cesarean section	1,128,950	13.5
2	MST021: Perineal muscle laceration repair (2nd degree obstetrical and other)	673,655	8.1
3	FRS005: Fallopian tube ligation and excision	203,545	2.4
4	HEP006: Cholecystectomy	98,640	1.2
5	FRS003: Salpingectomy	84,615	1.0

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), National Inpatient Sample (NIS), 2019.

Prior to limiting to OR procedures, top 5 CCSR categories for this age group included spontaneous vaginal delivery, cesarean section, assisted vaginal delivery, perineal muscle laceration repair, and intravenous induction of labor.

Use Case: Most Common Operating Room Procedures

Most Common Operating Room Procedures, Age 18-44 Years, Maternal Stays Excluded

Rank	All-Listed Operating Room Procedures	Number of Inpatient Stays	Percent of Inpatient Stays, Ages 18-44
1	HEP006: Cholecystectomy	93,695	1.1
2	GIS010: Gastrectomy	75,470	0.9
3	GIS008: Appendectomy	59,850	0.7
4	MST011: Fixation of leg and foot bones	52,715	0.6
5	MST013: Spine fusion	51,435	0.6

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), National Inpatient Sample (NIS), 2019.

Prior to limiting to OR procedures, top 5 CCSR categories for this age group included venous and arterial catheter placement, mechanical ventilation, transfusion of blood and blood products, ultrasonography, and airway intubation.

Use Case: Most Common Operating Room Procedures

Most Common Operating Room Procedures, Age 45-64 Years

Rank	All-Listed Operating Room Procedures	Number of Inpatient Stays	Percent of Inpatient Stays, Ages 45-64
1	MST006: Knee arthroplasty	234,235	2.8
2	CAR004: Percutaneous coronary interventions (PCI)	201,395	2.4
3	MST013: Spine fusion	196,360	2.3
4	MST007: Hip arthroplasty	195,735	2.3
5	MST016: Vertebral discectomy	132,660	1.6

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), National Inpatient Sample (NIS), 2019.

Prior to limiting to OR procedures, top 5 CCSR categories for this age group included venous and arterial catheter placement, cardiac and coronary fluoroscopy, measurement during cardiac catherization, ultrasonography, and transfusion of blood and blood products.

Use Case: Most Common Operating Room Procedures

Most Common Operating Room Procedures, Age 65-74 Years

Rank	All-Listed Operating Room Procedures	Number of Inpatient Stays	Percent of Inpatient Stays, Ages 65-74
1	MST006: Knee arthroplasty	247,935	4.2
2	MST007: Hip arthroplasty	202,305	3.5
3	CAR004: Percutaneous coronary interventions (PCI)	142,830	2.4
4	MST013: Spine fusion	130,085	2.2
5	CAR020: Saphenous vein harvest and other therapeutic vessel removal	83,555	1.4

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), National Inpatient Sample (NIS), 2019.

Prior to limiting to OR procedures, top 5 CCSR categories for this age group included venous and arterial catheter placement, cardiac and coronary fluoroscopy, measurement during cardiac catherization, ultrasonography, and transfusion of blood and blood products.

Use Case: Most Common Operating Room Procedures

Most Common Operating Room Procedures, Age 75+ Years

Rank	All-Listed Operating Room Procedures	Number of Inpatient Stays	Percent of Inpatient Stays, Ages 75+
1	MST007: Hip arthroplasty	199,435	2.6
2	MST010: Femur fixation	166,880	2.2
3	MST006: Knee arthroplasty	144,420	1.9
4	CAR004: Percutaneous coronary interventions (PCI)	127,900	1.7
5	CAR023: Heart valve replacement and other valve procedures (endovascular)	64,720	0.9

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), National Inpatient Sample (NIS), 2019.

Prior to limiting to OR procedures, top 5 CCSR categories for this age group included venous and arterial catheter placement, cardiac and coronary fluoroscopy, measurement during cardiac catherization, ultrasonography, and transfusion of blood and blood products.

Questions or Comments?

Workshop Agenda Day 1

Topic	Duration	Start Time (PST/EST)
Introduction of HCUP	60 min	9:00 a.m./12:00 p.m.
HCUP Tools for ICD-10-PCS Procedures	60 min	10:00 a.m./1:00 p.m.
Q&A	10 min	11:00 a.m./2:00 p.m.
Break	10 min	11:10 a.m./2:10 p.m.
HCUP Tools for CPT® and HCPCS Level II Codes	40 min	11:20 a.m./2:20 p.m.
How to decide which procedure tool is best suited for your study?	5 min	12:00 p.m./3:00 p.m.
Brief introduction to resources on the HCUP-US website	5 min	12:05 p.m./3:05 p.m.
Q&A	15 min	12:10 p.m./3:10 p.m.

CCS-Services and Procedures

What Is the CCS-Services and Procedures?

CCS-Services and Procedures Includes Two Types of HCPCS Codes

- HCPCS Level I codes, which include CPT codes, are copyrighted and published by the American Medical Association
  - Used to report physician evaluation and management services and outpatient procedures (e.g., diagnostic and therapeutic surgical and nonsurgical procedures, radiological procedures, and laboratory tests)
- HCPCS Level II codes are developed and maintained by the Centers for Medicare & Medicaid Services (CMS)
  - Used to report items such as devices, durable medical equipment, prosthetics, orthotics, ancillary surgical supplies, nonphysician services, and healthcare supplies

CCS-Services and Procedures Groups HCPCS Codes Into Broad Procedure Categories

- When developed in 2005, the objective was to group CPT and HCPCS Level II codes into categories that aligned with the CCS for ICD-9-CM procedures
  - Retained all CCS categories included under ICD-9-CM
  - Added categories unique to the professional services and supplies identified by CPT and Level II HCPCS codes
    - Example: CCS 245 Telehealth for remote monitoring, telephone calls, online communication, etc.
- CCS-Services and Procedures has not been modified to align with the CCSR for ICD-10-PCS
  - Implication is that users are unable to compare clinical categories between the inpatient and outpatient settings using these tools

CCS-Services and Procedures

What Do I Need to Apply This Software Tool to My Data?

Specific Data Elements Are Required on Your Input Dataset

Required Data Elements for the CCS for Services and Procedures
Array of CPT and/or HCPCS Level II codes that will be used to assign CCS categories*

* Beginning v2020.1, the CCS-Services and Procedures includes CPT/HCPCS Level II codes valid for the specified calendar year; v2020.1 is specific to calendar year 2020.

CCS-Services and Procedures

How Should the CCS-Services and Procedures Be Used?

Leading Major Ambulatory Surgery Encounters in the U.S., 2018

CCS for Services and Procedures Category	AS Encounters (N), Weighted	Total Charges ($ Billions)
015: Lens and cataract procedures	1,057,991	10.2
084: Cholecystectomy and common duct exploration	501,264	11.5
160: Other therapeutic procedures on muscles and tendons (e.g., arthroscopic shoulder rotator cuff repair)	408,313	7.1
085: Inguinal and femoral hernia repair	358,967	8.0
086: Other hernia repair (e.g., umbilical hernia repair)	319,699	7.9
124: Hysterectomy, abdominal and vaginal	264,211	10.4
048: Insertion, revision, replacement, removal of cardiac pacemaker or cardioverter/defibrillator	217,917	17.3
225: Conversion of cardiac rhythm	137,130	13.5
158: Spinal fusion	69,720	4.0
026: Other therapeutic ear procedures (e.g., cochlear device implant)	25,913	1.5
049: Other OR heart procedures (e.g., septal defect repair)	12,060	0.8

Abbreviations: AS, ambulatory surgery; OR, operating room.

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), Nationwide Ambulatory Surgery Sample (NASS), 2018

Top Five CCS-Services and Procedures Categories for ED Treat-and-Release Visits

Number of ED Treat-and-Release Visits in the United States by CCS-Services and Procedures Category (N=123,392,577)

CCS Category	2018 NEDS (N based on all CPTs)	2018 NEDS Percent of Total
227: Consultation, evaluation, and preventative care	110,755,101	89.8
231: Other therapeutic procedures	47,362,539	38.4
233: Laboratory - Chemistry and Hematology	50,552,859	41.0
179: Computerized axial tomography (CT) scan abdomen	9,113,354	7.4
226: Other diagnostic radiology and related techniques	18,780,346	15.2

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), Nationwide Emergency Department Sample (NEDS) treat-and-release visits, 2018.

Recommendations for Reporting Utilization Statistics by CCS-Services and Procedures

- Consistent with recommendations for reporting by CCSR for ICD-10-PCS in inpatient data
- Report procedure volume based on **either the first-listed or any-listed procedure CCS category** depending on analytic purpose
- Report the statistic based on **the first-listed procedure CCS category** for estimates of resources (total charges[1]), in-hospital mortality rates, or readmissions
  - Limit to operating room procedures using the Surgery Flags Software for Services and Procedures

[1] Total hospital charges are indicative of the entire outpatient encounter and not specific to the first-listed procedure

CCS-Services and Procedures

Why Would Two SASD Have Drastically Different Distributions of the CCS for the First-listed CPT Code?

CCS-Services and Procedures Use Case: 2020 CA SASD

Top Five CCS-Services and Procedures Categories for the First-Listed CPT Code in the 2020 CA SASD (N=1.9M)

CCS Category	2020 CA SASD Percent of Total
76: Colonoscopy and biopsy	11.2
70: Upper gastrointestinal endoscopy, biopsy	8.2
15: Lens and cataract procedures	4.1
160: Other therapeutic procedures on muscles and tendons	2.3
47: Diagnostic cardiac catheterization, coronary arteriography	2.0

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), State Ambulatory Surgery and Services Databases, California, 2020.

Summary Statistics for State databases available on the HCUP-US website at www.hcup-us.ahrq.gov/cdstats/cdstats_search.jsp

CCS-Services and Procedures Use Case: 2020 MN SASD

Top Five CCS-Services and Procedures Categories for the First-Listed CPT Code in the 2020 MN SASD (N=7.0M)

CCS Category	2020 MN SASD Percent of Total
227: Consultation, evaluation, and preventative care	14.7
233: Laboratory - Chemistry and Hematology	13.7
235: Other Laboratory	4.6
213: Physical, occupational, and speech therapy exercises; manipulation; and other procedures	4.4
206: Microscopic examination (bacterial smear, culture, toxicology)	3.6

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), State Ambulatory Surgery and Services Databases, Minnesota, 2020.

Summary Statistics for State databases available on the HCUP-US website at www.hcup-us.ahrq.gov/cdstats/cdstats_search.jsp

CCS-Services and Procedures Use Case: SASD File Compositions

- The SASD include encounter-level data for ambulatory surgeries and may also include other types of outpatient services such as observation stays, hospital outpatient clinic visits, lithotripsy, imaging, and chemotherapy.
- The File Compositions will detail the types of data provided by the HCUP Partner

SASD File Compositions available on the HCUP-US website at www.hcup-us.ahrq.gov/db/state/sasddist/sasd_multi.jsp

CCS-Services and Procedures Use Case: CA SASD File Composition

- The CA Partner collects data on ambulatory surgery
  - Ambulatory surgery procedures as those performed on an outpatient basis in general operating rooms, ambulatory surgery rooms, endoscopy units, or cardiac catheterization laboratories.
  - If a procedure was performed elsewhere (such as in a radiology unit), the encounter is not included in the data file.

CCS-Services and Procedures Use Case: MN SASD File Composition

- The MN Partner collects data on ambulatory surgery and other outpatient services
  - Other services include observation, pathology/lab, imaging, mammography, lithotripsy, physical/occupational/speech therapy, gastrointestinal procedures, cardiac catherization lab

Surgery Flags Software for Services and Procedures

What Is the Surgery Flags Software for Services and Procedures?

Eligible CPT Codes Have Changed Over Time

- When initially developed in 2013, surgical CPT codes (in the range 10004–69990) were categorized consistent with the criteria used for the Surgery Flags for ICD-9-CM procedures
- In 2018, the range of CPT codes was expanded to include temporary codes for emerging or experimental services, technology, or procedures
- In 2020, the range of CPT codes was expanded to include CPT codes under radiology and medicine services and procedures
  - All eligible codes were rereviewed by a clinical panel

Surgery Flags Software for Services and Procedures Identifies Surgical Procedures Based on Certain Key Criteria

- Surgical procedures identified in the following CPT code ranges:

CPT Category I, Surgery	10004–69990
CPT Category I, Radiology procedures	70010–79999
CPT Category I, Medicine services and procedures	90281–99756, excluding the evaluation and management codes in the range 99201–99499
CPT Category III, Emerging technology	0042T–0593T

Note: the Surgery Flags Software for Services and Procedures does not include HCPCS Level II codes

Surgery Flag Values

- Eligible CPT codes identified as *one* of the following:
  - Narrow surgical procedure
  - Broad surgical procedure
  - Neither a Narrow nor a Broad surgical procedure
- Assignment based on the following characteristics:
  - Does the procedure need to be performed in an operating room (i.e., is it a major procedure)?
  - Is the purpose of the major or minor procedure to determine the diagnosis of illness (diagnostic) or for the treatment of a condition (therapeutic)?
  - How invasive is the procedure to the human body?
  - Does the procedure require that the patient receive some type of anesthesia or sedation for pain control?

Narrow Surgical Procedures (Surgery Flag Value 2)

- A *major therapeutic procedure* involving incision, excision, manipulation, or suturing of tissue that—
  - Requires the use of an operating room and
  - Penetrates or breaks the skin and
  - Involves regional anesthesia, general anesthesia, or sedation to control pain
- Below are examples of Narrow procedures:
  - Amputation of limb
  - Arthroplasty
  - Reconstruction (e.g., breast, atria, eyelid)
  - Incisions and drainage if the procedure is for a deep abscess, bursa, or below the fascia

Broad Surgical Procedures (Surgery Flag Value 1)

- A *major diagnostic procedure* or a *minor therapeutic procedure* involving incision, excision, manipulation, or suturing of tissue that—
  - Penetrates or breaks the skin and
  - Often requires the use of an operating room and
  - May involve regional anesthesia, general anesthesia, or sedation to control pain
- Below are examples of Broad procedures:
  - Endoscopic procedures if they include a therapeutic intervention (e.g., incision, destruction of lesion) or diagnostic removal of tissue (e.g., excision, removal of polyp)
  - Biopsy of tissue (not within an internal organ)
  - Exploratory laparoscopy if performed for a diagnostic purpose
  - Episiotomy

Neither (Narrow nor Broad) Procedure (Surgery Flag Value 0)

- A minor diagnostic procedure or a minor therapeutic procedure that did not meet the definition for a Narrow or Broad surgical procedure
- Below are examples of procedures classified as Neither:
  - Lithotripsy
  - Endoscopy (including colonoscopy) without biopsy or removal of tissue (i.e., visual inspection for diagnostic purpose)
  - Ablation of nerve or vein
  - Injections, even if performed for catheter placement
- In addition, CPT codes that only are reported in tandem with another CPT code to provide additional information are also considered Neither (Narrow nor Broad) procedures

Surgery Flags for Services and Procedures

What Do I Need to Apply This Software Tool to My Data?

Specific Data Elements Are Required on Your Input Dataset

Required Data Elements for the Surgery Flags for Services and Procedures
Array of CPT codes will be used to identify the surgery flag indication*

* Beginning v2020.1, the Surgery Flags for Services and Procedures includes CPT codes valid for the specified calendar year; v2020.1 is specific to calendar year 2020

Surgery Flags-Services and Procedures

How Should the Surgery Flags-Services and Procedures Be Used?

Percentage of SASD Records With Narrow and Broad Surgeries

An indication of Broad and Narrow surgeries is included on the SASD

2020 SASD	Total SASD	Records With One or More Narrow Surgeries	Records With One or More Broad Surgeries
California	N=1.9M	45.0%	75.9%
Minnesota	N=7.0M	3.0%	6.4%

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), State Ambulatory Surgery and Services Databases (SASD), 2020.

An indication of Broad and Narrow surgeries will be added to the SEDD in 2020

Using the CCS and Surgery Flags Software for Services and Procedures

- The CCS-Services and Procedures is often used to report encounters related to specific procedures in the outpatient setting
- If the focus is major therapeutic surgeries, the Surgery Flags Software for Services and Procedures can be used to limit the count to Narrow surgeries
- Consider CCS 113, Transurethral resection of prostate (TURP), which includes seven individual CPT codes
  - Two codes are Narrow procedures, and five codes are Broad procedures
- Limiting SASD records to those that include a CPT code in CCS 113 that is Narrow (surgery flag value 2) would result in a count of major therapeutic TURP encounters in the State

Example Using CCS and Surgery Flags Software for Services and Procedures

Percentage of Pooled SASD Records That Are Narrow or Broad Surgeries Within CCS-Services and Procedures Categories

CCS-Services and Procedures Category	Percentage of Total Category Records		
	Narrow	Broad	Neither
85: Inguinal and femoral hernia repair	100.0	0.0	0.0
87: Laparoscopy	61.3	38.6	0.0
146: Treatment for the fracture or dislocation of hip and femur	43.3	20.7	36.0
214: Traction, splints, and other wound care	0.1	0.5	99.5

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), State Ambulatory Surgery and Services Databases (SASD) for California, Florida, Nebraska, New Jersey, and South Carolina, 2018.

CCS-Services and Procedures

What Is the Distribution of Encounters in the 2020 CA and MN SASD If We Limit to Narrow and Broad Surgeries?

CCS-Services and Procedures Use Case: 2020 CA SASD Narrow Surgeries

Top Six CCS-Services and Procedures Categories for the Encounters with a First-Listed Narrow CPT Code

CCS Category	2020 CA SASD N Encounters
15 Lens and cataract procedures	75,886
160 Other therapeutic procedures on muscles and tendons	42,663
84 Cholecystectomy and common duct exploration	38,084
85 Inguinal and femoral hernia repair	33,586
152 Arthroplasty knee	27,032
166 Lumpectomy, quadrantectomy of breast	22,974

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), State Ambulatory Surgery and Services Databases, California, 2020.

CCS-Services and Procedures Use Case: 2020 MN SASD Narrow Surgeries

Top Six CCS-Services and Procedures Categories for the Encounters with a First-Listed Narrow CPT Code

CCS Category	2020 MN SASD N Encounters
15 Lens and cataract procedures	25,493
160 Other therapeutic procedures on muscles and tendons	9,404
84 Cholecystectomy and common duct exploration	8,196
85 Inguinal and femoral hernia repair	7,236
6 Decompression peripheral nerve	5,613
80 Appendectomy	5,431

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), State Ambulatory Surgery and Services Databases, Minnesota, 2020.

CCS-Services and Procedures Use Case: 2020 CA SASD Broad Surgeries

Top Six CCS-Services and Procedures Categories for the Encounters with a First-Listed Broad CPT Code

CCS Category	2020 CA SASD N Encounters
76 Colonoscopy and biopsy	148,918
70 Upper gastrointestinal endoscopy, biopsy	120,216
130 Other diagnostic procedures, female organs	22,209
170 Excision of skin lesion	22,080
54 Other vascular catheterization, not heart	19,315
107 Extracorporeal lithotripsy, urinary	17,375

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), State Ambulatory Surgery and Services Databases, California, 2020.

CCS-Services and Procedures Use Case: 2020 MN SASD Broad Surgeries

Top Six CCS-Services and Procedures Categories for the Encounters with a First-Listed Broad CPT Code

CCS Category	2020 MN SASD N Encounters
76 Colonoscopy and biopsy	64,445
70 Upper gastrointestinal endoscopy, biopsy	30,854
169 Debridement of wound, infection or burn	17,712
88 Abdominal paracentesis	9,861
165 Breast biopsy and other diagnostic procedures on breast	7,836
170 Excision of skin lesion	7,649

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), State Ambulatory Surgery and Services Databases, Minnesota, 2020.

HCUP Tools Related to ICD-10-PCS and CPT/HCPCS Level II Procedures

Which HCUP Tool Would You Use?

Which HCUP Tool(s) Best Supports the Research Question?

What is the national estimate of pediatric inpatient stays involving heart or kidney transplant using the 2019 KID?

- CCSR for ICD-10-PCS
- Procedures Classes Refined for ICD-10-PCS
- CCS for Services and Procedures
- Surgery Flags Software for Services and Procedures

Which HCUP Tool(s) Best Supports the Research Question?

What is the national estimate of pediatric inpatient stays involving heart or kidney transplant using the 2019 KID?

CCSR for ICD-10-PCS

Which HCUP Tool(s) Best Supports the Research Question?

What is the national estimate of pediatric inpatient stays involving heart or kidney transplant using the 2019 KID?

Table 3. Weighted and Unweighted Number of Records by Clinical Classifications Software Refined (CCSR) for ICD-10-PCS Procedures, v2021.1
Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), Kids' Inpatient Database (KID), 2016 and 2019
Note: Unduplicated means that if two or more procedure codes on the same discharge record mapped to the same CCSR category, the discharge record was only counted once. An asterisk (*) indicates the value has been suppressed because of small sample size.

CCSR for ICD-10-PCS Category, v2021.1	CCSR Description, v2021.1	2019 KID: Weighted N for PR1 CCSR	2019 KID: Weighted N for All-Listed CCSR (Unduplicated)	2019 KID: Unweighted N for PR1 CCSR	2019 KID: Unweighted N for All-Listed CCSR (Unduplicated)
CAR018	CAR018 Heart transplant	508	558	377	414
GIS023	GIS023 GI transplant	23	31	17	23
HEP011	HEP011 Liver transplant	541	588	400	435
HEP012	HEP012 Pancreas transplant		19		14
LYM009	LYM009 Thymus transplant	*	*	*	*
LYM010	LYM010 Spleen transplant		*		*
RES013	RES013 Lung transplant	70	82	52	61
URN011	URN011 Kidney transplant	982	1,015	727	751

www.hcup-us.ahrq.gov/db/nation/kid/HCUP-KID2016-DXandPRfreqs.xlsx

Which HCUP Tool(s) Best Supports the Research Question?

What is the number of major ambulatory surgeries for the treatment of a fractured or dislocated hip or femur in 2018 Florida SASD?

- **CCSR for ICD-10-PCS**
- **Procedures Classes Refined for ICD-10-PCS**
- **CCS for Services and Procedures**
- **Surgery Flags Software for Services and Procedures**

Which HCUP Tool(s) Best Supports the Research Question?

What is the number of major ambulatory surgeries for the treatment of a fractured or dislocated hip or femur in 2018 Florida SASD?

CCS for Services and Procedures

Surgery Flags Software for Services and Procedures

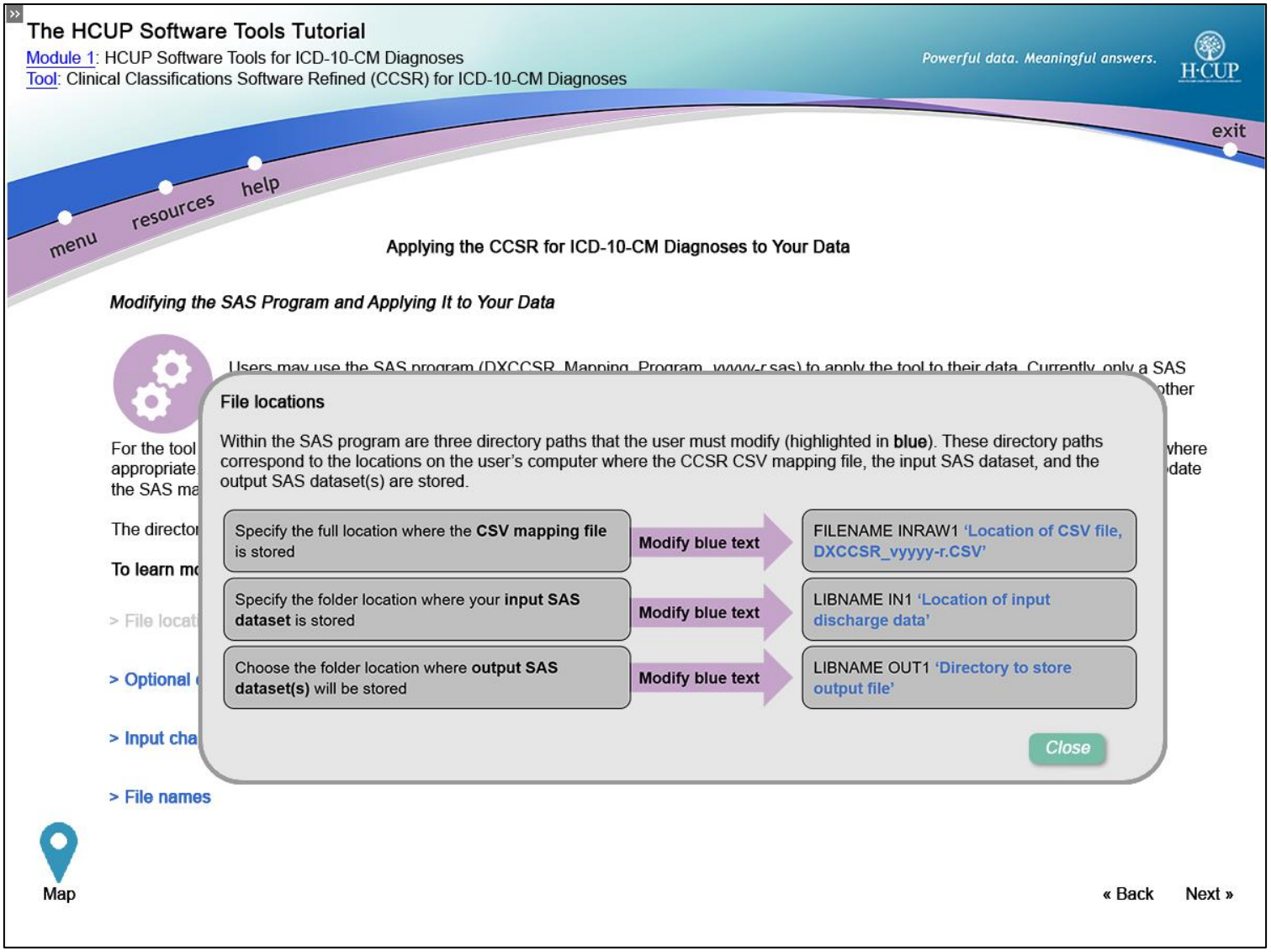
Resources for the HCUP Software Tools

Where Can I Find More Information on the HCUP Software Tools?

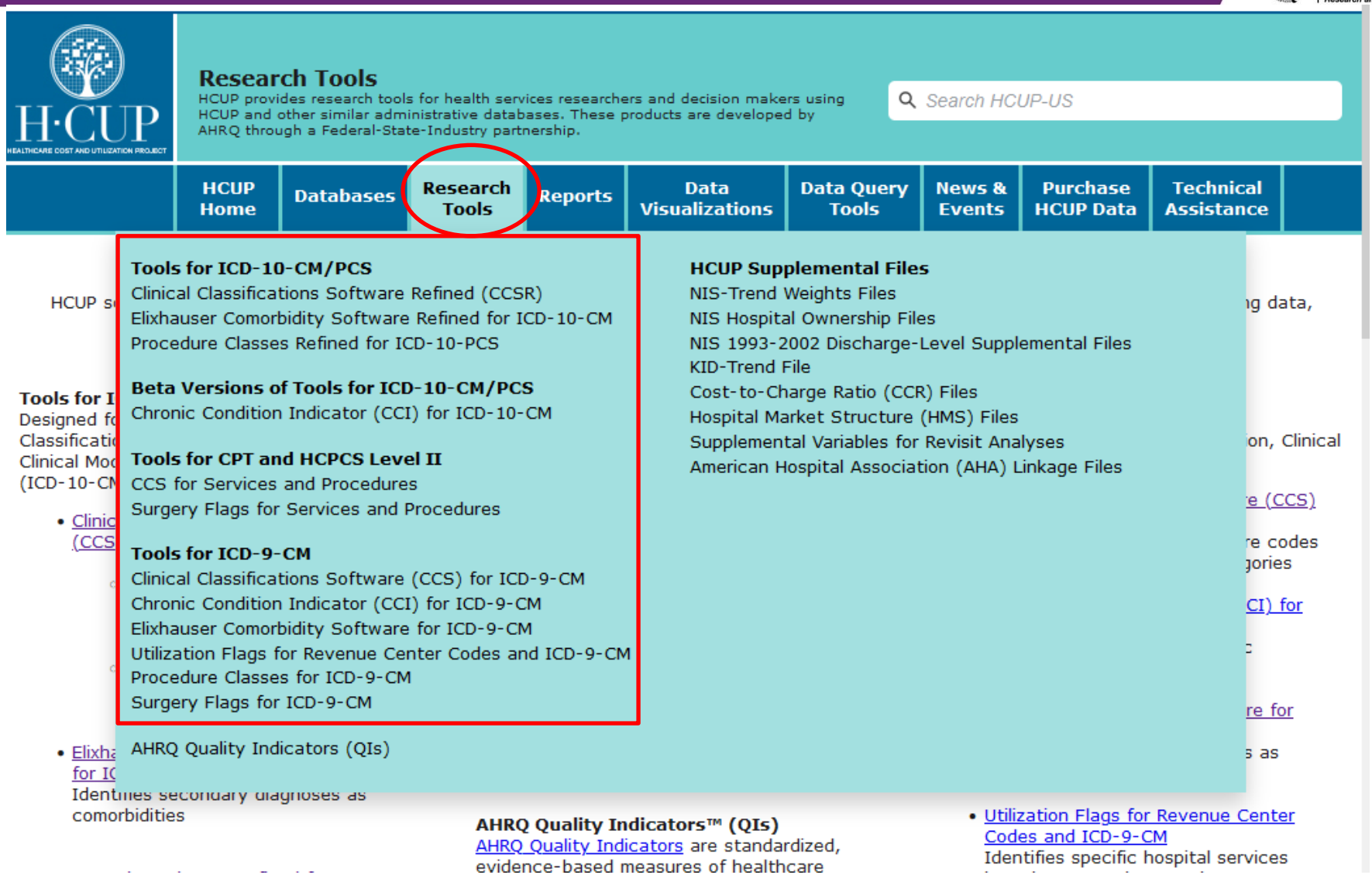
HCUP Software Tools Tutorial

- HCUP has developed a series of free, interactive courses to provide HCUP data users with information about HCUP data, HCUP software tools, and technical methods for conducting research with HCUP data
  - Available at www.hcup-us.ahrq.gov/tech_assist/tutorials.jsp
- Tools Tutorial
  - Organized into four modules based on coding system (e.g., Tools for ICD-10-CM Diagnoses)
  - Includes technical guidance on applying the HCUP software tools to administrative data
    - Detailed instructions on modifications to SAS programs for each tool

Example of Technical Guidance in HCUP Software Tools Tutorial

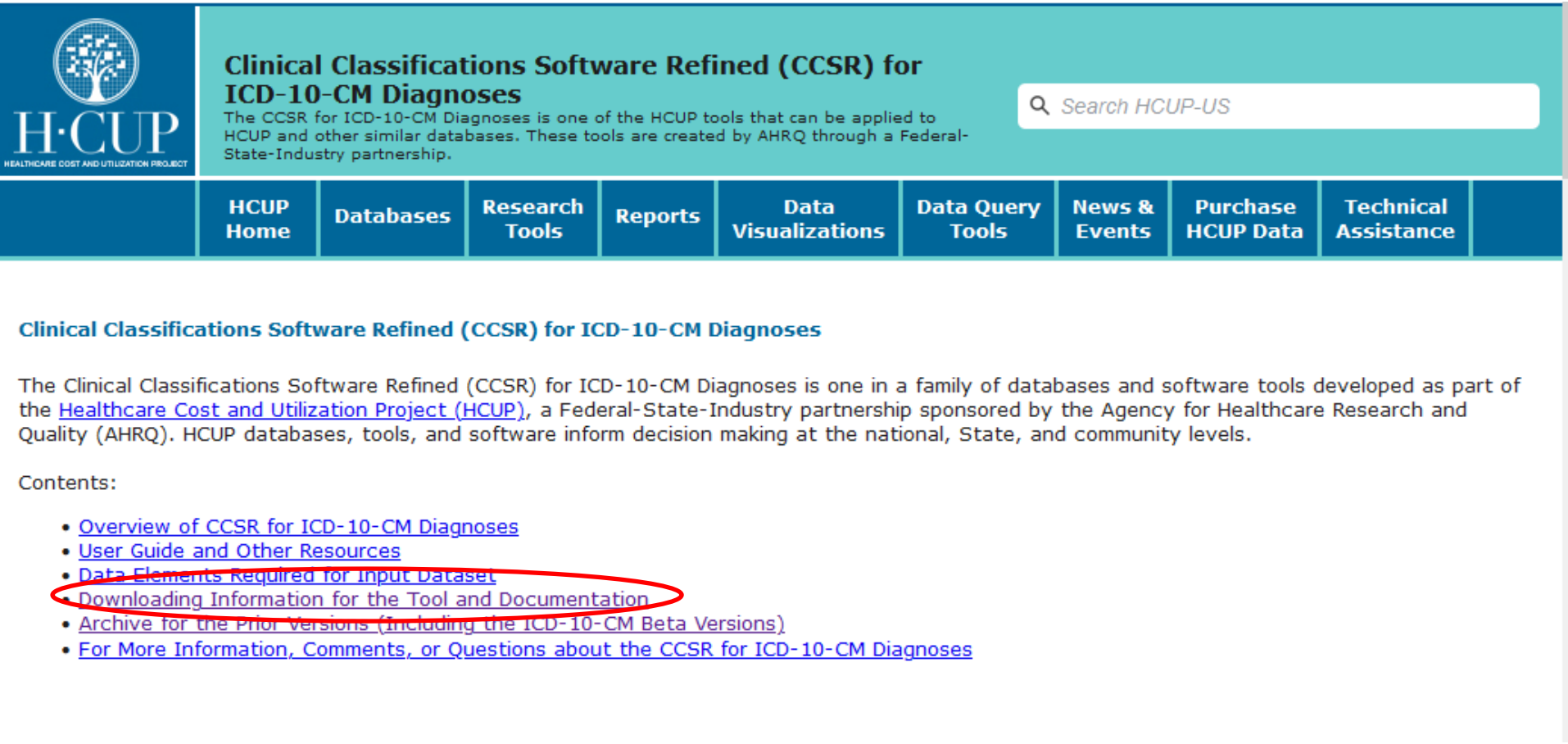


Software and Documentation for HCUP Tools Also on HCUP-US Website



www.hcup-us.ahrq.gov/tools_software.jsp

Similar Documentation Available for Each of the Software Tools



H-CUP
HEALTHCARE COST AND UTILIZATION PROJECT

Clinical Classifications Software Refined (CCSR) for ICD-10-CM Diagnoses

The CCSR for ICD-10-CM Diagnoses is one of the HCUP tools that can be applied to HCUP and other similar databases. These tools are created by AHRQ through a Federal-State-Industry partnership.

Search HCUP-US

HCUP Home | Databases | Research Tools | Reports | Data Visualizations | Data Query Tools | News & Events | Purchase HCUP Data | Technical Assistance

Clinical Classifications Software Refined (CCSR) for ICD-10-CM Diagnoses

The Clinical Classifications Software Refined (CCSR) for ICD-10-CM Diagnoses is one in a family of databases and software tools developed as part of the Healthcare Cost and Utilization Project (HCUP), a Federal-State-Industry partnership sponsored by the Agency for Healthcare Research and Quality (AHRQ). HCUP databases, tools, and software inform decision making at the national, State, and community levels.

Contents:

- Overview of CCSR for ICD-10-CM Diagnoses
- User Guide and Other Resources
- Data Elements Required for Input Dataset
- Downloading Information for the Tool and Documentation
- Archive for the Prior Versions (Including the ICD-10-CM Beta Versions)
- For More Information, Comments, or Questions about the CCSR for ICD-10-CM Diagnoses

Versioning of the HCUP Software Tools

How Often Are the HCUP Software Tools Updated?

Different Versioning Between the Procedure-Related HCUP Software Tools

- HCUP software tools for ICD-10-PCS
  - Updated annually to coincide with fiscal year coding changes
  - Each release includes codes effective as of October 1, 2015, through the current fiscal year
    - For example, v2022.1 of the CCSR for ICD-10-PCS procedures to include codes valid from October 2015 through September 2022
- HCUP software tools for CPT/HCPCS Level II codes
  - Updated annually to coincide with calendar year changes
  - Each release includes codes specific to the calendar year
    - For example, v2021.1 of the CCS-Services and Procedures includes codes only valid for calendar year 2021

Availability of HCUP Software Tools on HCUP Databases

What HCUP Databases Include the HCUP Software Tools?

Availability of HCUP Software Tools for ICD-10-PCS on HCUP Databases

- HCUP nationwide databases
  - Data year 2019:
    - Includes CCSR for ICD-10-PCS procedures and Procedure Classes Refined for ICD-10-PCS
  - Data years 2016-2018:
    - Do not include data elements derived from the HCUP software tools for ICD-10-PCS
- HCUP State databases
  - Data year 2020:
    - Includes CCSR for ICD-10-PCS procedures and Procedure Classes Refined for ICD-10-PCS
  - Data years 2016-2019:
    - Do not include data elements derived from the HCUP software tools for ICD-10-PCS

Availability of HCUP Software Tools for CPT/HCPCS Level II on HCUP Databases

- HCUP nationwide databases
  - NASS includes CCS-Services and Procedures and indication of type of procedure (narrow or broad) for all years
  - NEDS includes CCS-Services and Procedures for all data years
- HCUP State databases
  - SASD and SEDD include the CCS-Services and Procedures (if they had CPT/HCPCS Level II codes)
  - SASD include data elements derived from the Surgery Flags starting in 2016
  - SEDD include data elements derived from the Surgery Flags starting in 2020

References From Today's Presentation

Where Can I Find Additional Information About Some of the External Resources Cited in Today's Presentation?

References

- ICD-10-PCS Coding Guidelines
  - *ICD-10-PCS Official Guidelines for Coding and Reporting FY 2021*
    - www.cms.gov/files/document/2021-official-icd-10-pcs-coding-guidelines-updated-december-1-2020.pdf

Acknowledgements

- HCUP software tools were developed under contract to AHRQ by contractor, IBM® Watson Health®
- AHRQ acknowledges additional contributions from the following:
  - American Health Information Management Association-certified trainers
  - Clinical experts

Questions/Comments?

Time for questions and/or comments

E-mail: hcup@ahrq.gov

Thank you!

- Thank you for joining Day 1 of the Virtual HCUP Data Analytic Tools Workshop!
- We hope to see you tomorrow for Day 2, which will cover the tools for ICD-10-CM diagnoses
- Please take a moment to share your feedback on today's presentation by responding to the polling questions on the right side of your screen